



**HIGH-PERFORMANCE**

# **FIBER OPTIC**

**INTERCONNECT SOLUTIONS**

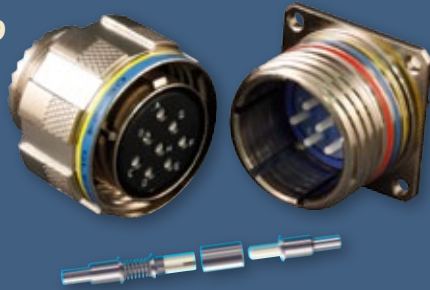
**AUGUST 2012**





# 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**



**Copper-to-Fiber  
Media Converters/  
Active Components**



**Glenair High Density (GHD)  
Fiber Optic Connection System**



**Series 80  
Mighty Mouse  
Fiber Optic  
Connection System**

**Glenair Front Release (GFR) Fiber Optic  
Connection System**





**Glenair Fiber Optic Systems Overview and Selection Guide**

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**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**

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**Electrical to Fiber Optic Media Converters and Active Cables**

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**Glenair Front Release (GFR) Fiber Optic Connection System**

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**Fiber Optic Cable and Conduit**

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**Appendix: Introduction to Fiber Optic Terms and Technology  
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**F**iber 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:

A

## 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.





### 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.*



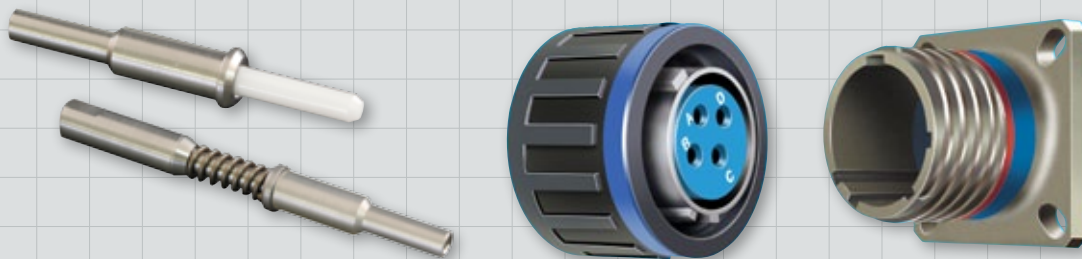
**M**IL-DTL-38999 type fiber optic interconnection systems are the recognized standard for all military and commercial aerospace applications that depend on high levels of connector reliability, environmental and mechanical performance and low dB insertion loss. Designed specifically for air and space, 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.



**T**he 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  $\mu$  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.



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.

A

# 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.

**T**he 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-equipped 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.

**G**lenair 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.

## A

# 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.



**T**he 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.

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).

## A

# 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.

**T**he 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.

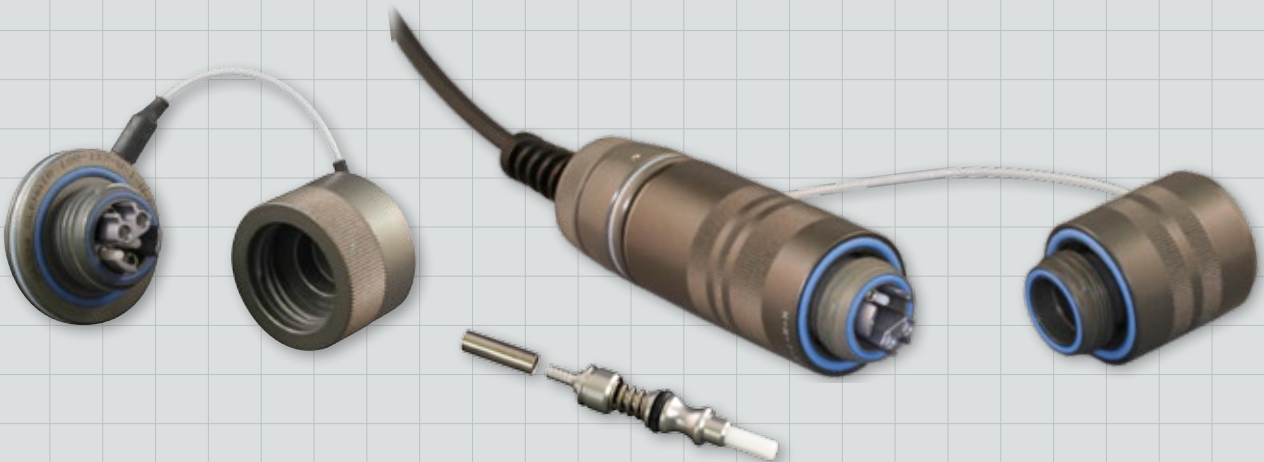
# GFOCA HERMAPHRODITIC

## MIL-DTL-83526 TYPE FIBER OPTIC CONNECTION SYSTEM

A

- *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.



**M**IL-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.

# 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 comprehensive 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 terminus design and more.

## BUILD-TO-PRINT

# FIBER OPTIC

## CABLE HARNESS DESIGNER'S GUIDE

A

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  $\mu\text{m}$
- 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  $\mu\text{m}$
- 62.5/125  $\mu\text{m}$
- 100/140  $\mu\text{m}$
- Other

Test wavelength

- 850 nm
- 1300 nm

Acceptable optical dB insertion loss

- Less than .5 dB
- Less than 1.0 dB



## 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 Convuluted 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:

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

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

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## 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 \_\_\_\_\_

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.



# MIL-DTL-38999 Series III Type Fiber Optic Connection System General Information

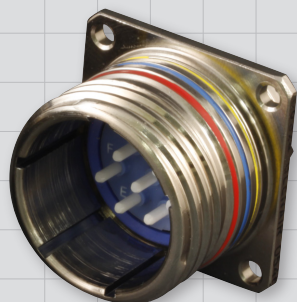
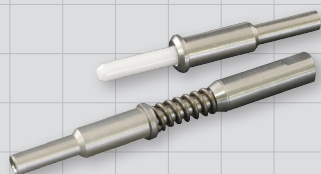


MIL-DTL-38999  
Series III Type

## 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.

B

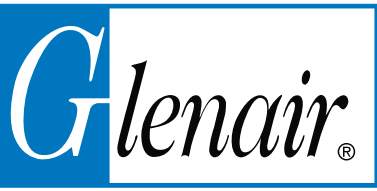


Product No.	Description	Page No.
<b>MIL-PRF-29504 QPL Fiber Optic Termini</b>		
181-001	M29504/05 Socket Terminus, Size 16	B-2
181-002	M29504/04 Pin Terminus, Size 16	B-3
187-019/187-029	Dust Caps for Pin and Socket Termini, Size 16	B-4
181-035	Large Core Fiber Socket Terminus, Size 16	B-5
181-036	Large Core Fiber Pin Terminus, Size 16	B-6
181-052	Jewel Pin Terminus, Size 16	B-7
181-053	Jewel Socket Terminus, Size 16	B-8
181-048	Dummy Sealing Plug, Size 16	B-9
181-065	Size 20 Pin Terminus	B-10
181-066	Size 20 Socket Terminus	B-11
<b>MIL-DTL-38999 Type Fiber Optic Connectors and Threaded Protective Covers</b>		
180-091	Contact arrangements and panel cut-outs	B-12
180-091 (05)	In-Line Receptacle Connector	B-14
180-091 (06)	Plug Connector	B-16
180-091 (08)	Jam Nut Mount Receptacle Connector	B-18
180-091 (H7)	Square Flange Wall Mount Receptacle Connector, Round holes (std.)	B-20
180-091 (S7)	Square Flange Wall Mount Receptacle Connector, Slotted holes	B-22
180-091 (T7)	Square Flange Wall Mount Receptacle Connector, Threaded holes	B-24
660-023/024, 660-049/050	Threaded Protective Covers, Metal and Composite	B-26
<b>Backshells and Adapters</b>		
189-016	Environmental Backshell with Banding Strain Relief	B-30
189-037	Environmental Backshell with Banding Strain Relief	B-32
377-014	Composite Thermoplastic Backshell	B-34
377-040	Composite Strain Relief Backshell	B-36
377-041	Composite Helical Conduit Adapter	B-38
189-038	Composite Backshell Adapter for Helical Conduit	B-40
712-416	Composite Backshell Adapter for PEEK Helical Conduit	B-42
630-015	Cable Bulkhead Adapter with Braid Sock and Shrink Sleeve	B-44
<b>ASAP Fiber Optic Cable Sets</b>		
FO1000 thru FO1005	Overmolded Cables, Conduit Assemblies, Field-Repairable Backshell Assemblies, and Inside-the-Box Pigtail Assemblies	B-46
<b>Single Channel Connectors for Use with MIL-PRF-29504 Termini</b>		
180-071 (-3)	Single Channel Square Flange Wall Mount Receptacle Connector	B-58
180-071 (-4)	Single Channel Jam Nut Mount Receptacle Connector	B-60
180-071 (-6)	Single Channel Plug Connector	B-62
189-047	Plug and Receptacle Protective Cover for Series 180-071 Connectors	B-64
189-055	Environmental Backshell for Series 180-071 Connectors	B-66
180-076	Fiber Optic Splice, Size 16	B-67
<b>2 Channel Connectors for Use with MIL-PRF-29504 Termini</b>		
180-052	2 Channel Receptacle Connector	B-68
180-053	2 Channel Plug Connector	B-69

### 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°





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



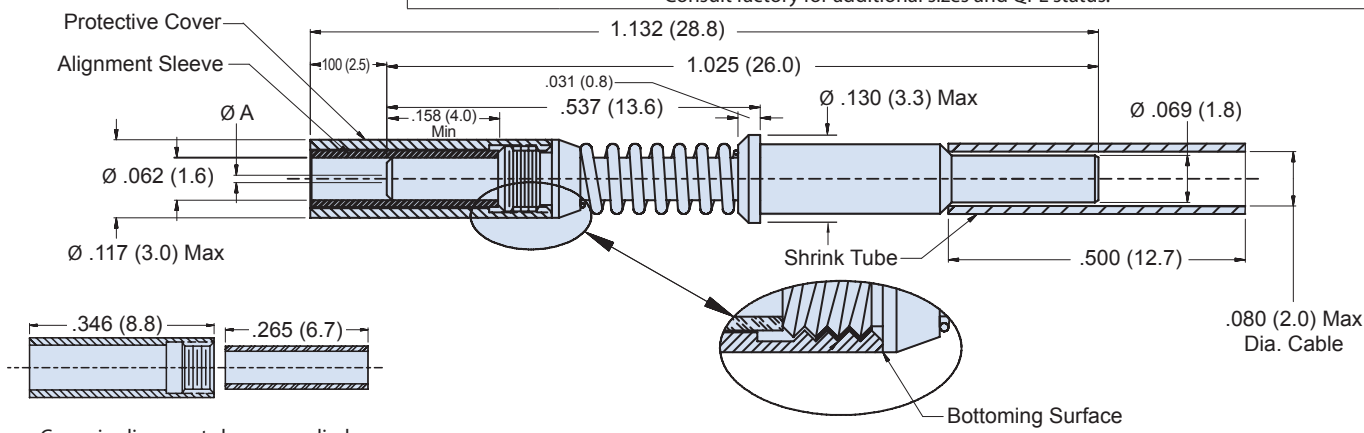
**B**

**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. 181-001-126K.

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

M29504/04

181-002

Size 16 MIL-DTL-38999 Series III Type Fiber Optic Pin Terminus

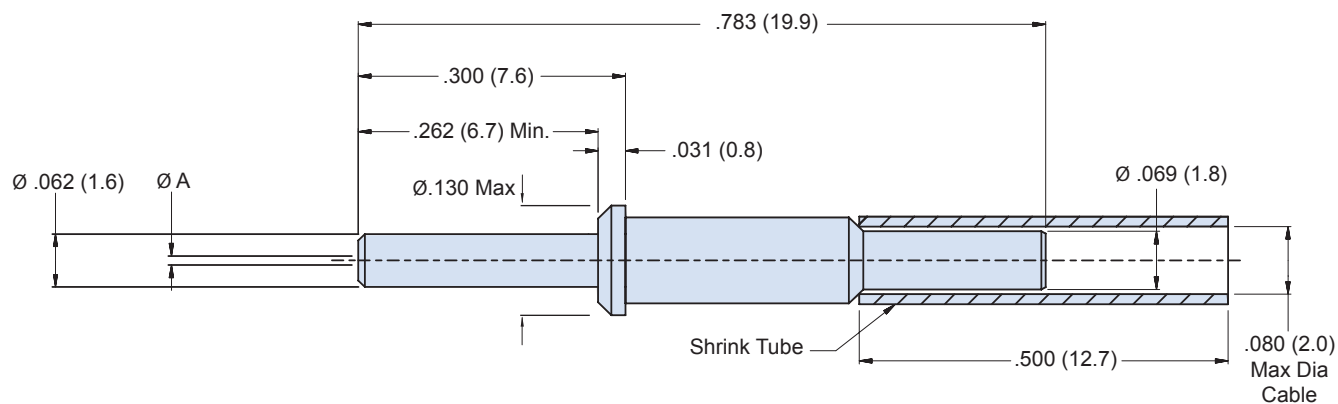
MIL-DTL-38999  
Series III Type

### 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
<a href="#">181-002-125</a>	9/125 (Singlemode)	125.5	M29504/04-4208
<a href="#">181-002-126S</a>	9/125 (Singlemode)	126.0	M29504/04-4209
<a href="#">181-002-126</a>	50/125 & 62.5/125	126.0	M29504/04-4210
<a href="#">181-002-127</a>	50/125 & 62.5/125	127.0	M29504/04-4040
<a href="#">181-002-142</a>	100/140	142.0	M29504/04-4043
<a href="#">181-002-144</a>	100/140	144.0	N/A
<a href="#">181-002-145</a>	100/140	145.0	M29504/04-4044
<a href="#">181-002-156</a>	62.5/125/155 (Polyimide)	156.0	M29504/04-4211
<a href="#">181-002-157</a>	62.5/125/155 (Polyimide)	157.0	M29504/04-4212
<a href="#">181-002-173</a>	100/140/172 (Polyimide)	173.0	M29504/04-4087
<a href="#">181-002-175</a>	100/140/172 (Polyimide)	175.0	M29504/04-4213
<a href="#">181-002-231</a>	200/230	231.0	N/A
<a href="#">181-002-236</a>	200/230	236.0	M29504/04-4214
<a href="#">181-002-286</a>	200/280	286.0	M29504/04-4215
<a href="#">181-002-448</a>	400/440	448.0	M29504/04-4216
<a href="#">181-002-533</a>	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

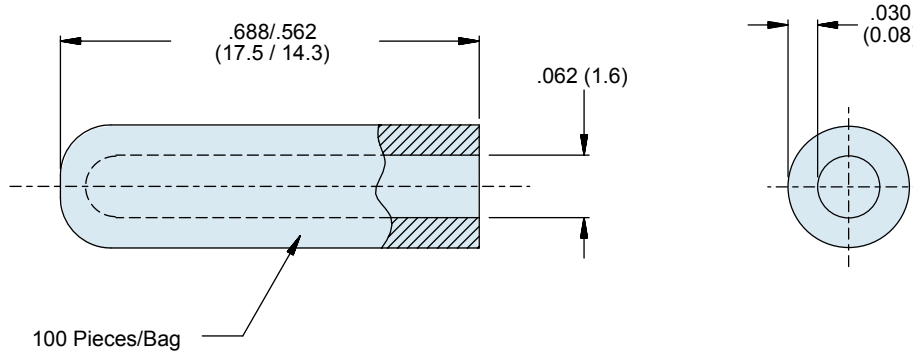
#### Notes

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

**Size 16 pin terminus vinyl dust caps**

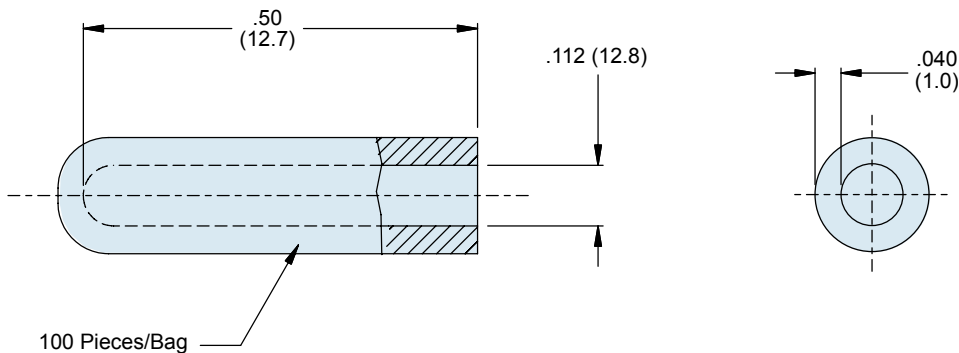
**187-019 Vinyl Dust Cap for Size 16 Terminus with .0625 Ferrules**

B



**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



181-035  
Large Core Optical Fiber Socket Terminus  
MIL-DTL-38999 Series III Type



MIL-DTL-38999  
Series III Type

D38999  
Series III

B

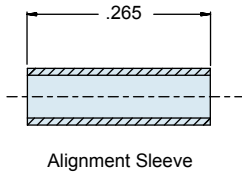
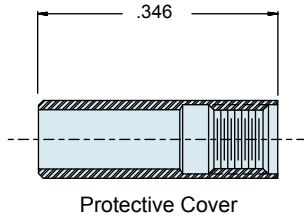
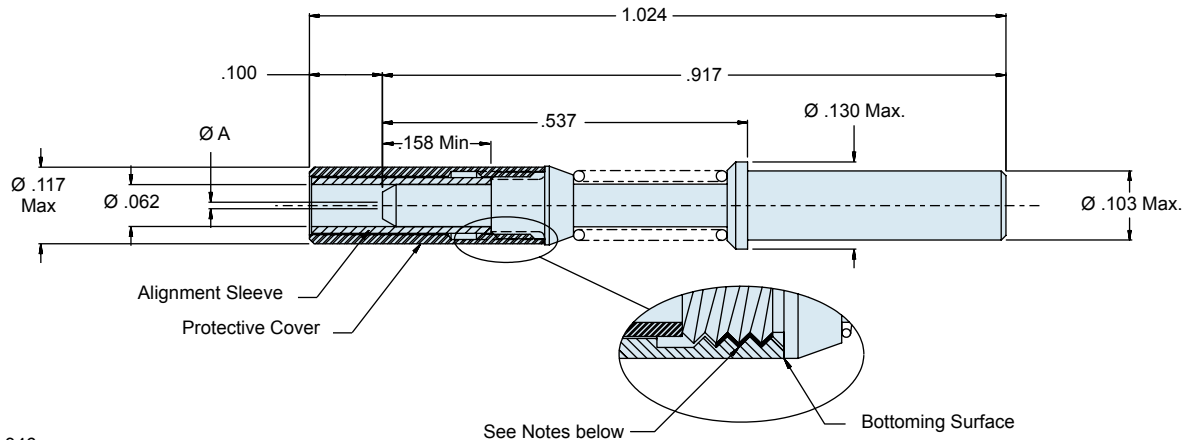
Large core fiber optic MIL-DTL-38999 type size 16 socket terminus



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. 181-035-1000K.

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



**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



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

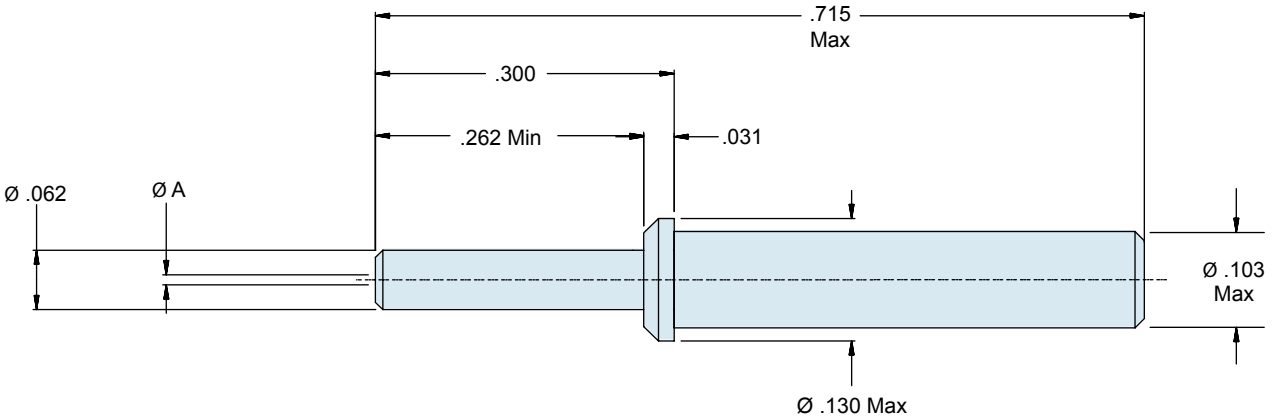


**B**

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



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



**Material and Finish**

Ferrule and Terminus Body: Stainless Steel/Passivate

**Notes**

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

181-052  
Size 16 Fiber Optic Jewel Pin Terminus  
MIL-DTL-38999 Series III Type



MIL-DTL-38999  
Series III Type

D38999  
Series III

**MIL-DTL-38999 type fiber optic jewel pin terminus**

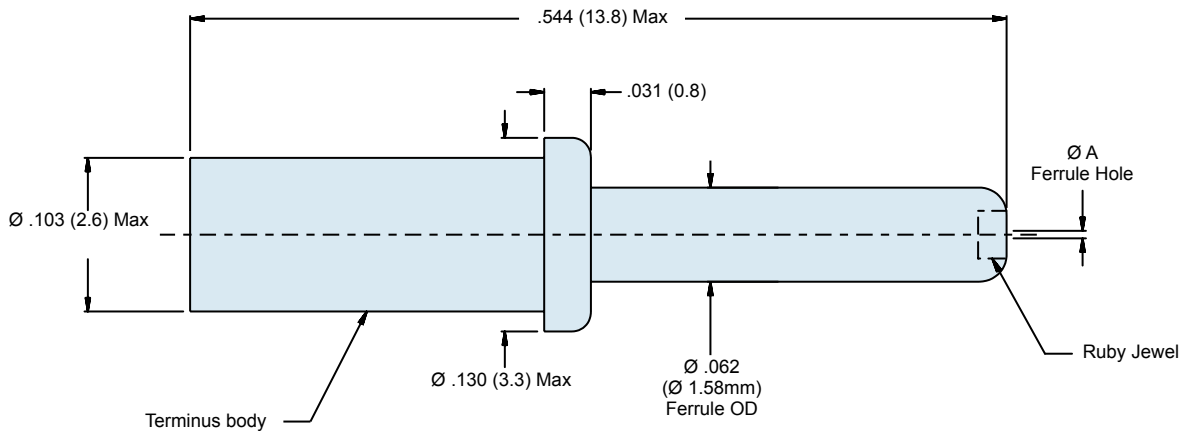
**B**



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

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. 181-052-127L. Omit to include 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





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

**D38999**  
Series III

**B**

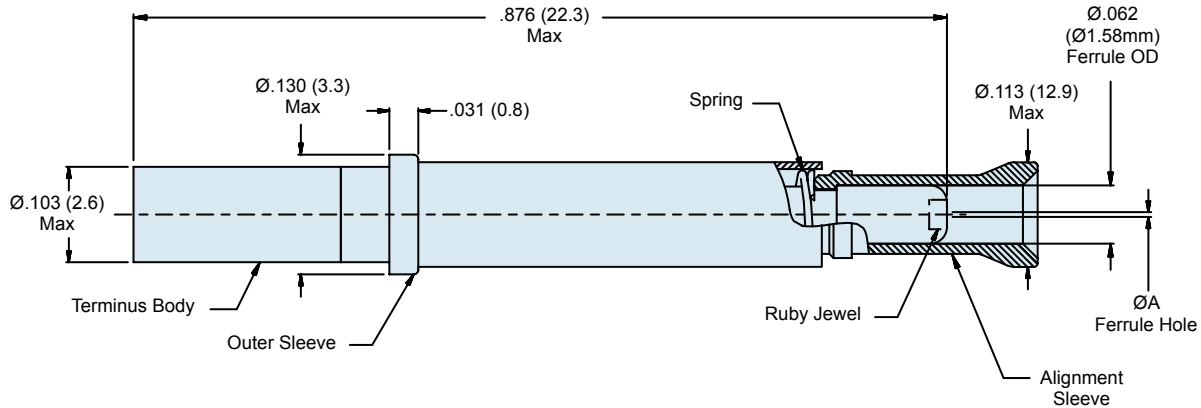
**Fiber optic jewel socket terminus for MIL-DTL-38999 type connectors**



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. 181-053-127L. 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.

181-048  
Size 16 Dummy Terminus  
For use with MIL-DTL-38999 Series III Type Connectors



MIL-DTL-38999  
Series III Type

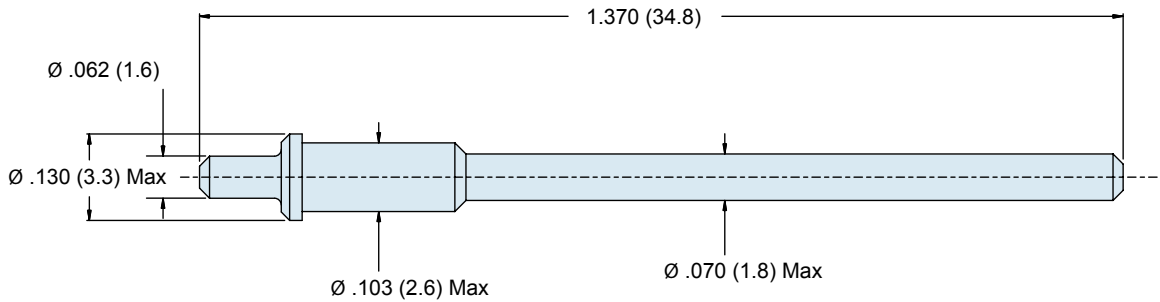


**Dummy terminus for MIL-DTL-38999 connectors**



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

B



**Material and Finish/Notes**

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



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

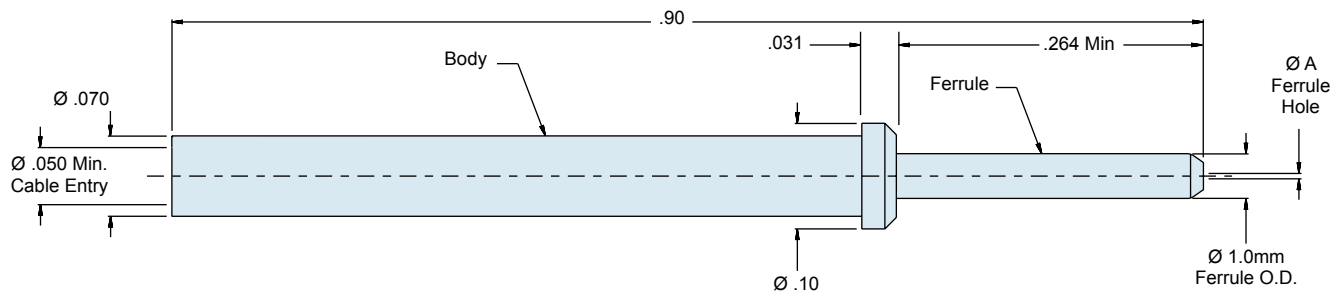
D38999  
Series III

B

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



Part Number	Fiber Size Core/Cladding (Microns)	ØA (Microns)	Typ. Fiber Type
<b>181-065-1255</b>	9/125	125.5	Singlemode
<b>181-065-126</b>	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.



181-066  
Size 20 Socket Terminus  
MIL-DTL-38999 Series III Type



MIL-DTL-38999  
Series III Type

D38999  
Series III

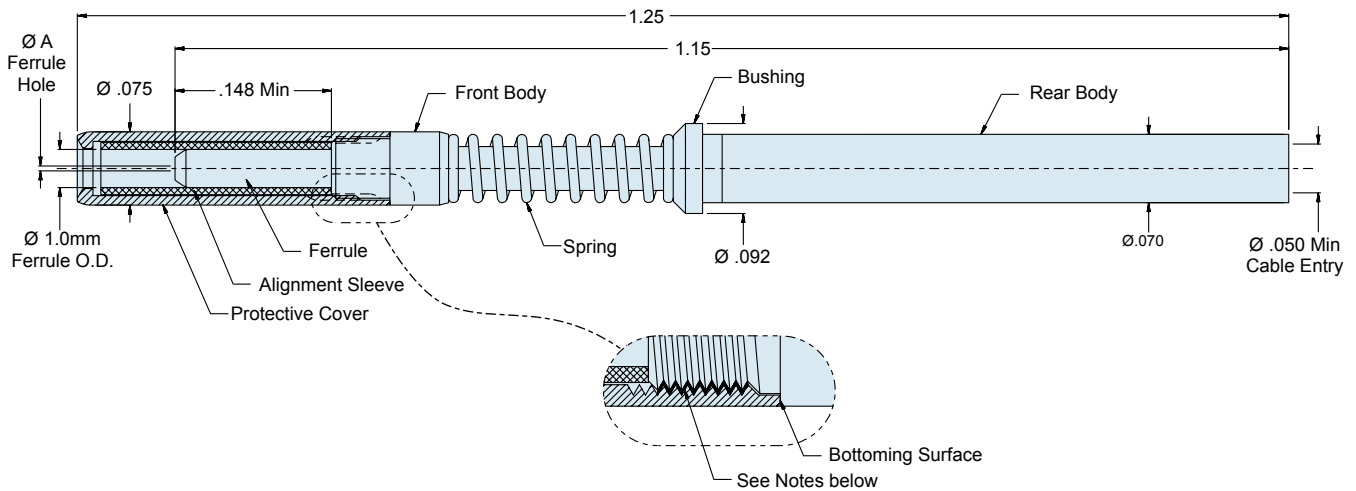
B

**MIL-DTL-38999 type size 20 socket terminus**



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

Terminus Accessories	
Part Number	Terminus Accessory
<a href="#">181-066-S</a>	Ceramic Alignment Sleeve
<a href="#">181-066-C</a>	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

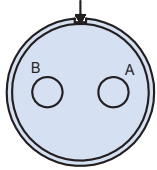
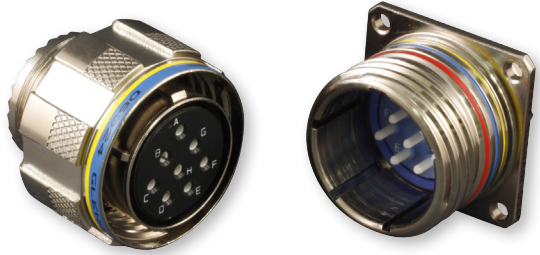
**Notes**

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

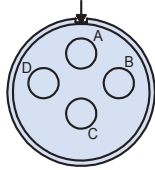


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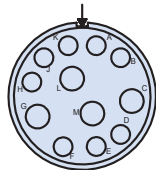
MIL-DTL-38999 type advanced fiber optic connectors



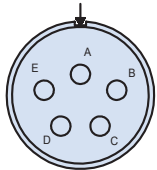
Shell Size 11  
Arrangement 2



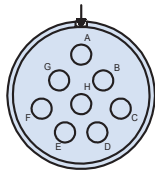
Shell Size 13  
Arrangement 4



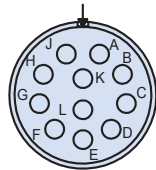
Shell Size 15  
Arrangement 97



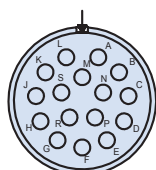
Shell Size 15  
Arrangement 5



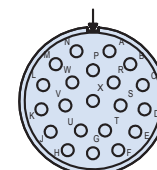
Shell Size 17  
Arrangement 8



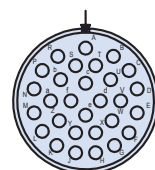
Shell Size 19  
Arrangement 11



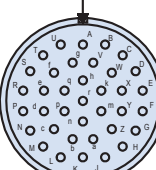
Shell Size 21  
Arrangement 16



Shell Size 23  
Arrangement 21



Shell Size 25  
Arrangement 29



Shell Size 25  
Arrangement 37

Mating face of pin insert shown

Contact Arrangements per MIL-STD-1560

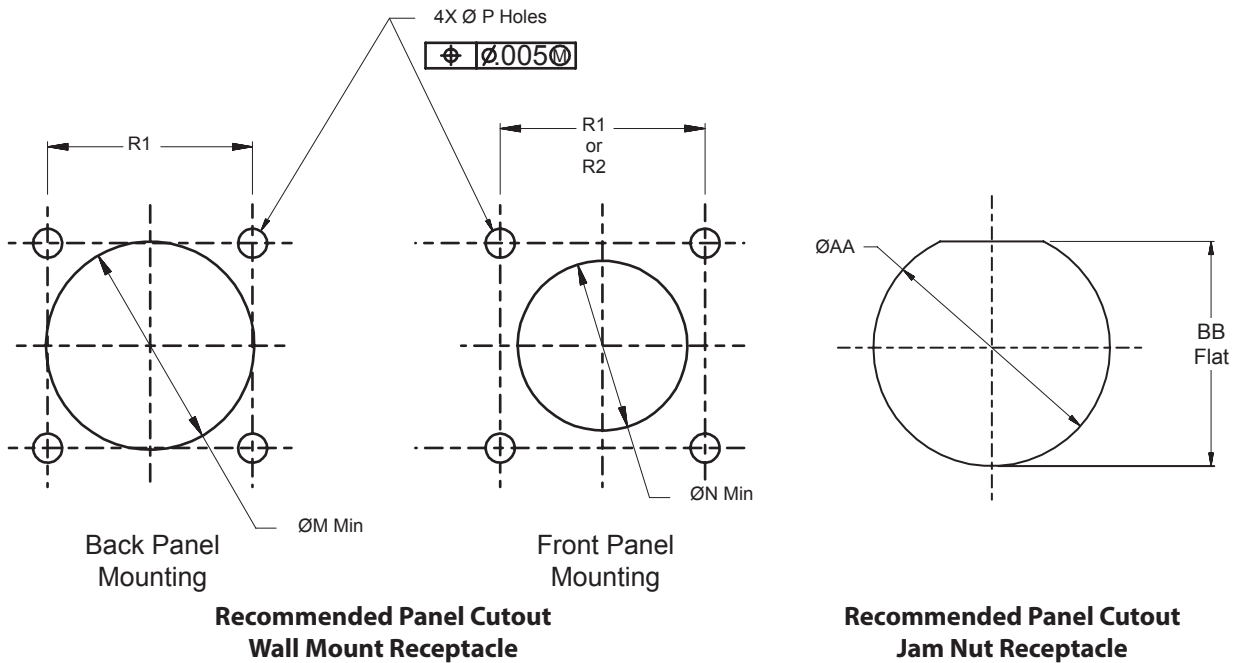
180-091  
MIL-DTL-38999 Series III Type  
Fiber Optic Connection System  
Panel Cutouts



MIL-DTL-38999  
Series III Type

B

Table I								
Shell Size Code	Shell Size	Ø AA	BB Flat	Ø M Min	Ø N Min	Ø P Holes	R1 BSC	R1 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)





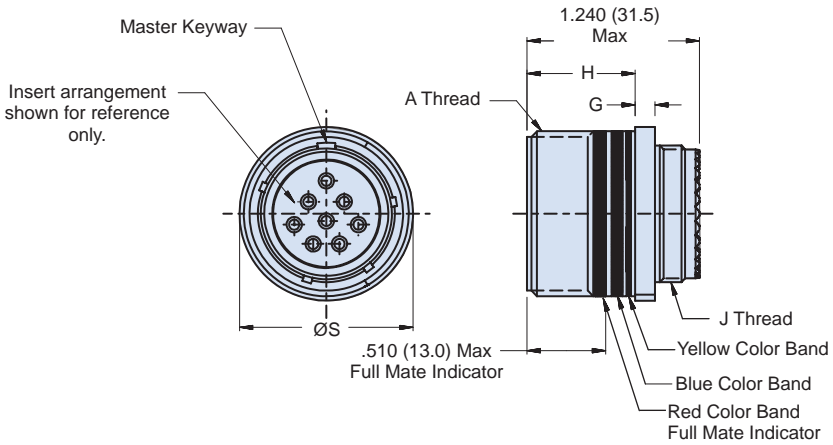
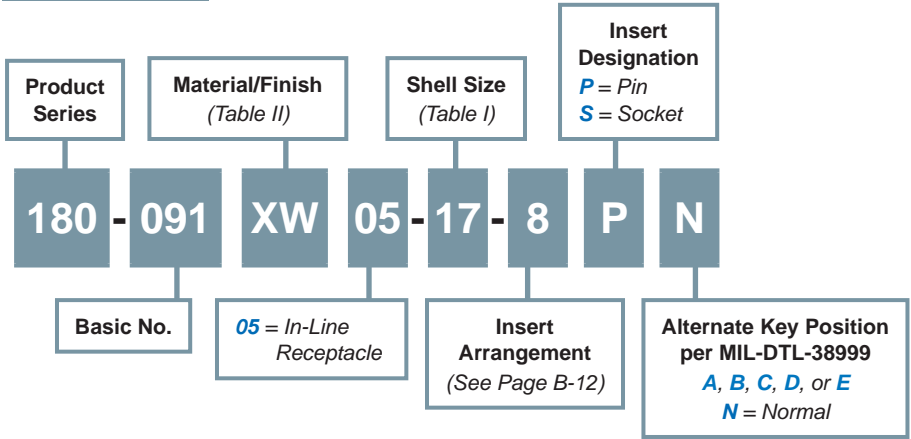
# 180-091 (05) In-Line Receptacle Advanced Fiber Optic Connector MIL-DTL-38999 Series III Type

D38999  
Series III

B

## MIL-DTL-38999 type advanced fiber optic receptacle connector

### How To Order



### 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.



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



MIL-DTL-38999  
Series III Type

**B**

**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
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
ZI		Passivate
AB	Marine Bronze	None (Clean Only)

Refer to Appendix for material/finish details



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

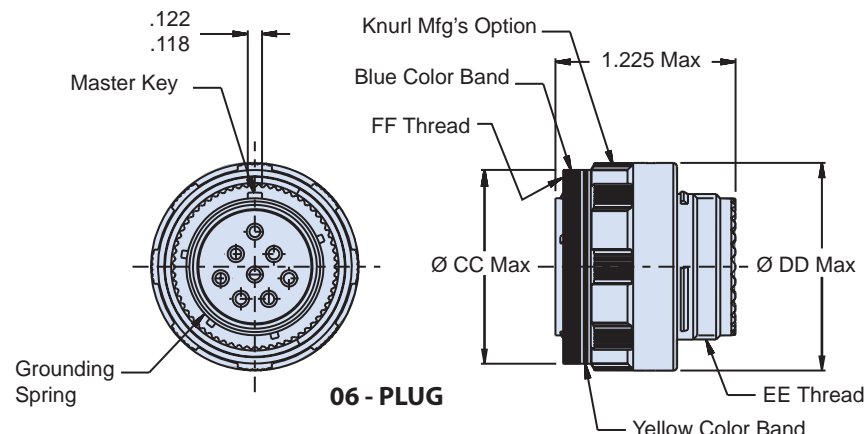
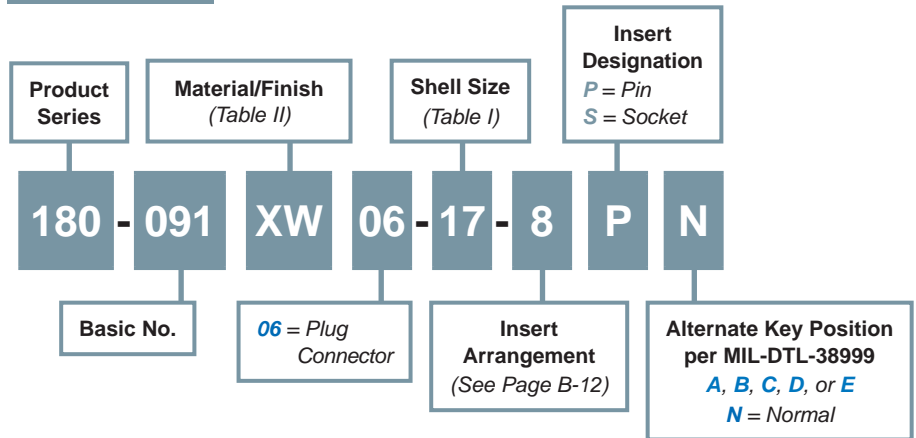
D38999  
Series III

B

MIL-DTL-38999 type advanced fiber optic plug connector



How To Order



**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.

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



MIL-DTL-38999  
Series III Type

B

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

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
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

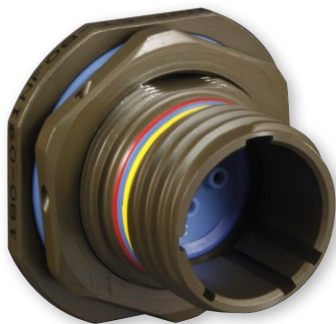


# 180-091 (08) Jam Nut Mount Receptacle Advanced Fiber Optic Connector MIL-DTL-38999 Series III Type

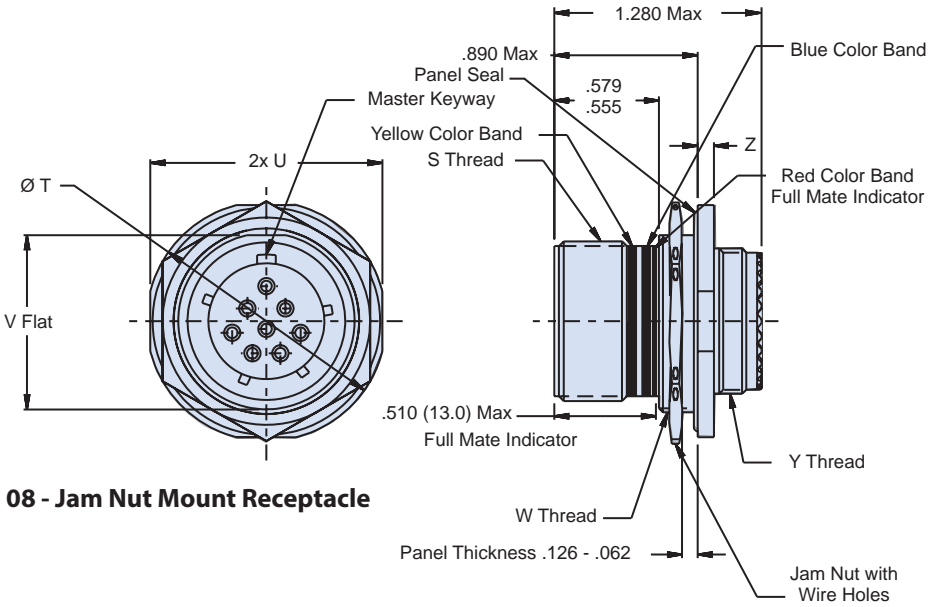
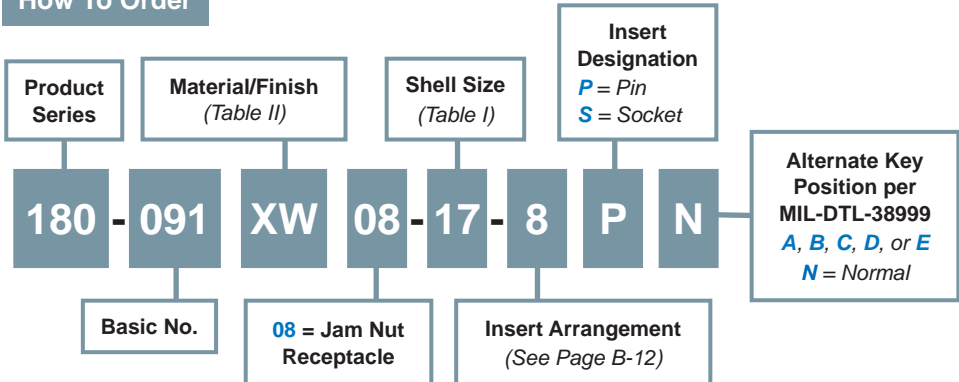
D38999  
Series III

B

## MIL-DTL-38999 type advanced fiber optic receptacle connector



### How To Order



### 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



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



MIL-DTL-38999  
Series III Type

**B**

**Table I**

Shell Size Code	Shell Size	S Thread	Ø T	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)

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
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

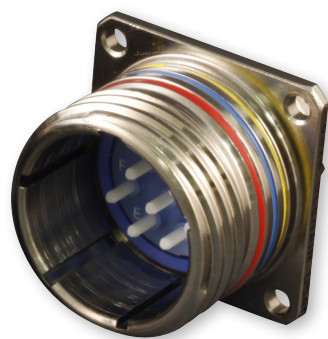


**180-091 (H7) Square Flange Wall Mount Receptacle  
Advanced Fiber Optic Connector  
MIL-DTL-38999 Series III Type with Round Holes (Standard)**

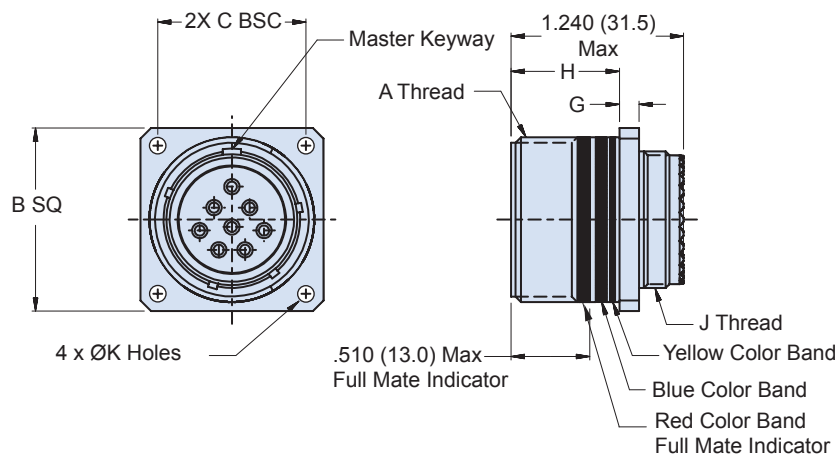
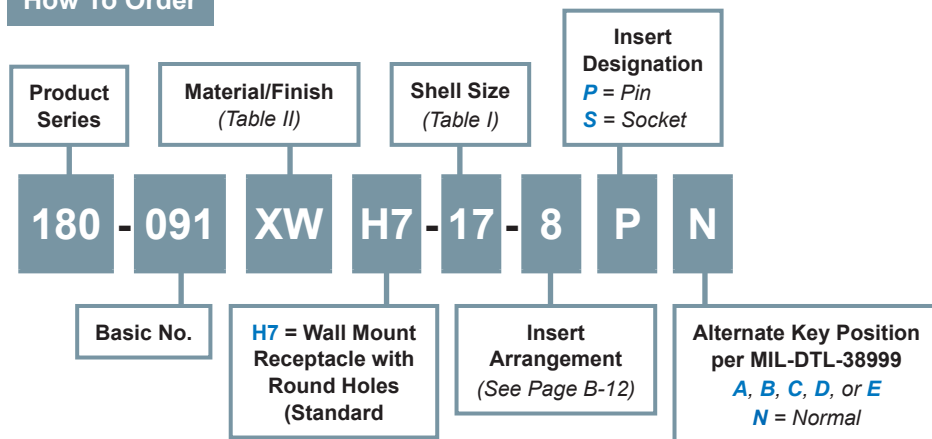
**D38999**  
Series III

**B**

**MIL-DTL-38999 type advanced fiber optic receptacle connector**



**How To Order**



**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

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



MIL-DTL-38999  
Series III Type

**B**

Table I

Shell Size Code	Shell Size	A Thread	B SQ	C BSC	G	H	J Thread	Ø K Holes
<b>B</b>	<b>11</b>	.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)
<b>C</b>	<b>13</b>	.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)
<b>D</b>	<b>15</b>	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)
<b>E</b>	<b>17</b>	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)
<b>F</b>	<b>19</b>	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)
<b>G</b>	<b>21</b>	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)
<b>H</b>	<b>23</b>	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)
<b>J</b>	<b>25</b>	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)

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

Refer to Appendix for material/finish details

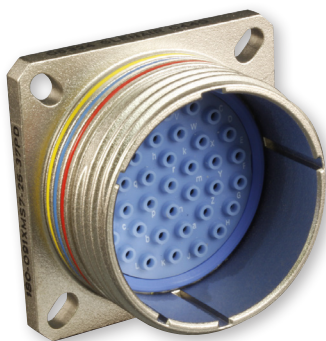


# 180-091 (S7) Square Flange Wall Mount Receptacle Advanced Fiber Optic Connector MIL-DTL-38999 Series III Type with Slotted Holes

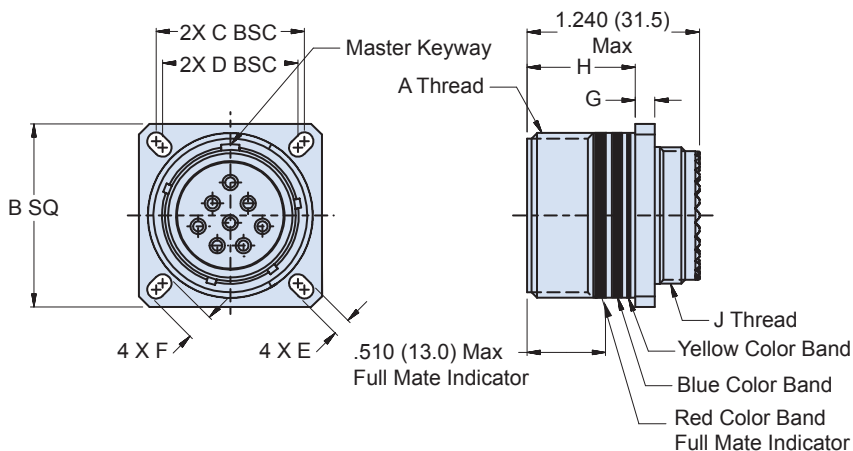
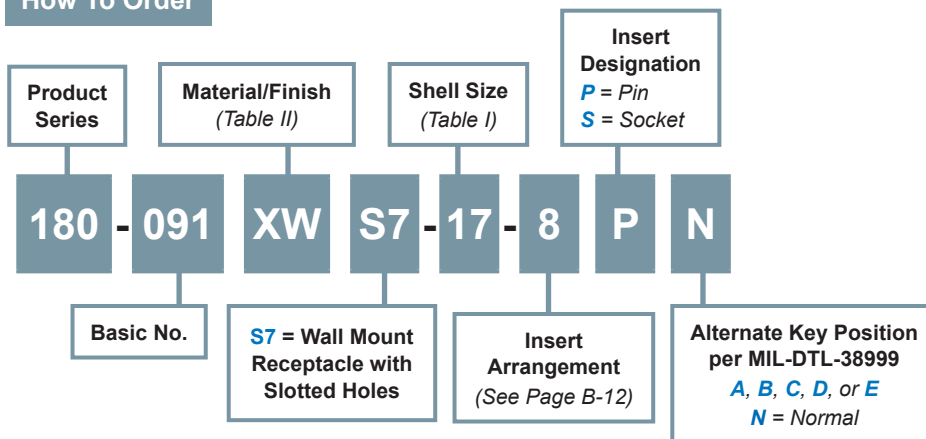
D38999  
Series III

## MIL-DTL-38999 type advanced fiber optic receptacle connector

B



### How To Order



**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



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



MIL-DTL-38999  
Series III Type

**B**

**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

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
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



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

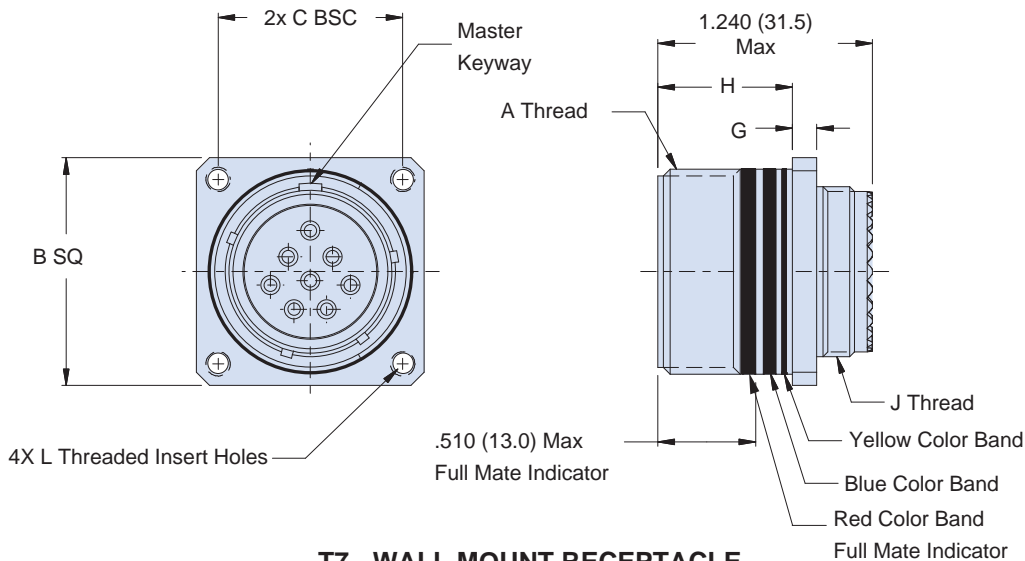
D38999  
Series III

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

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



MIL-DTL-38999  
Series III Type

**B**

Dimensions								
Shell Size Code	Shell Size	A Thread	B SQ	C BSC	G	H	J Thread	L Threaded Insert Holes
<b>B</b>	<b>11</b>	.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
<b>C</b>	<b>13</b>	.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
<b>D</b>	<b>15</b>	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
<b>E</b>	<b>17</b>	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
<b>F</b>	<b>19</b>	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
<b>G</b>	<b>21</b>	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
<b>H</b>	<b>23</b>	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
<b>J</b>	<b>25</b>	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

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

Refer to Appendix for material/finish details

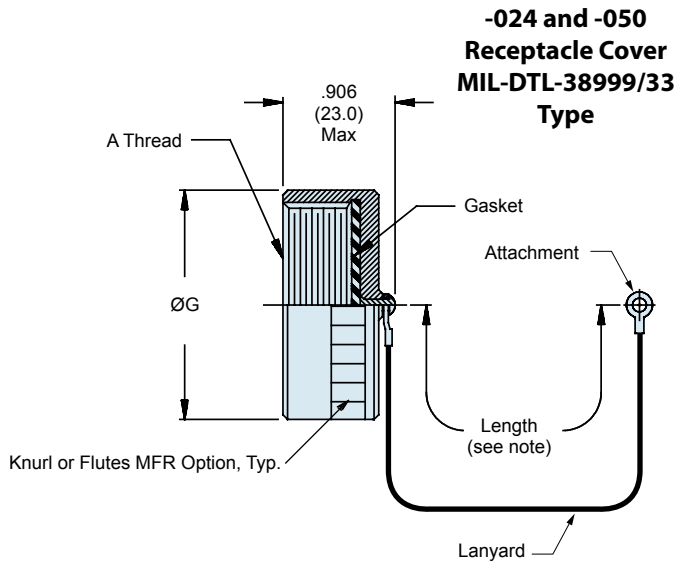
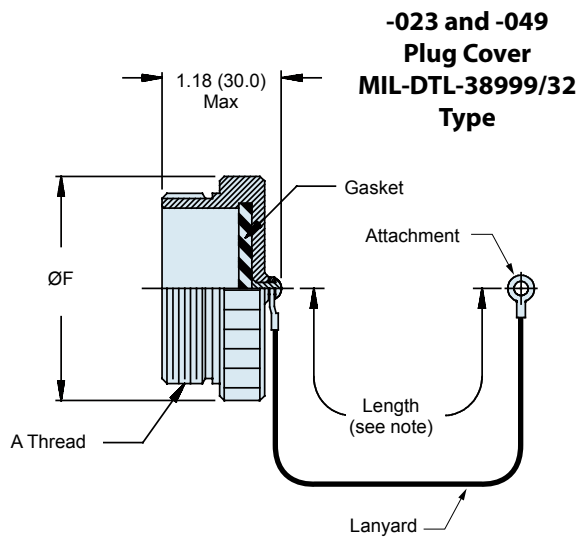
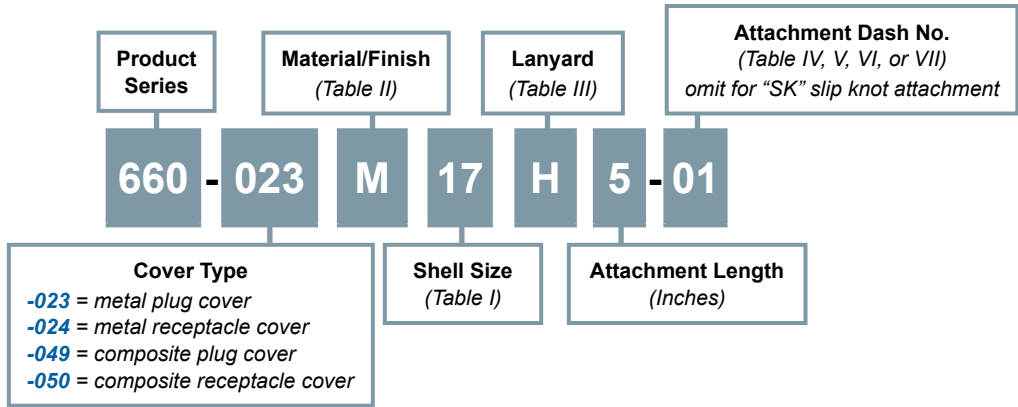


660-023 and -024 • 660-049 and -050  
MIL-DTL-38999 Series III Type  
Metal and Composite Protective Covers  
Plug and Receptacle

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

B

**How To Order**



**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.



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

B

Available Lanyard Types (shown with optional eyelet attachment, see table III for lanyard style)

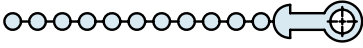
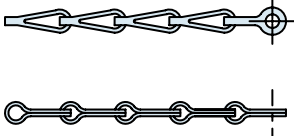

		
<b>Bead Chain</b> (Type D)	<b>Sash Chain</b> (Type S)	<b>Rope</b> (Types F, G, H, K, R, T, U)

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

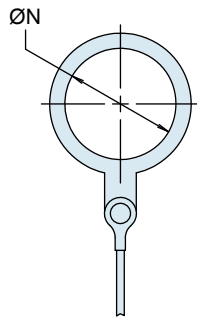
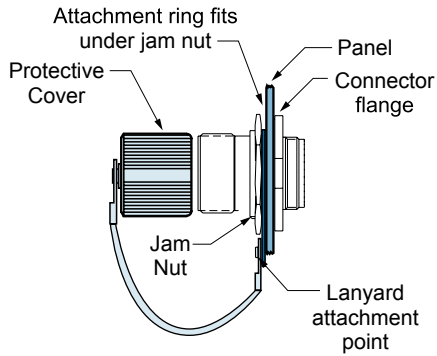
Refer to Appendix for material/finish details

Table III: Lanyard Codes

Code	Description
D	Bead Chain, CRES, Passivated
F	Wire Rope, Nylon Jacket
G	Nylon Rope, Black
H	Wire Rope, Teflon 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

B

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



Solid Ring - Style A

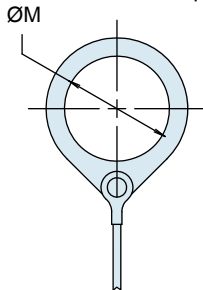
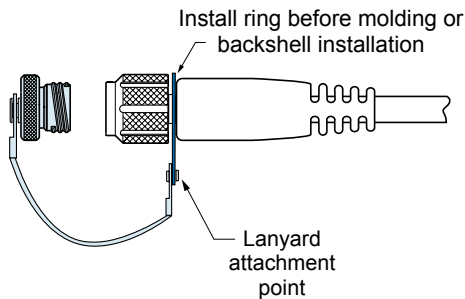
Table IV: Solid Ring Style A

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.

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



MIL-DTL-38999  
 Series III Type

B

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

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**

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	

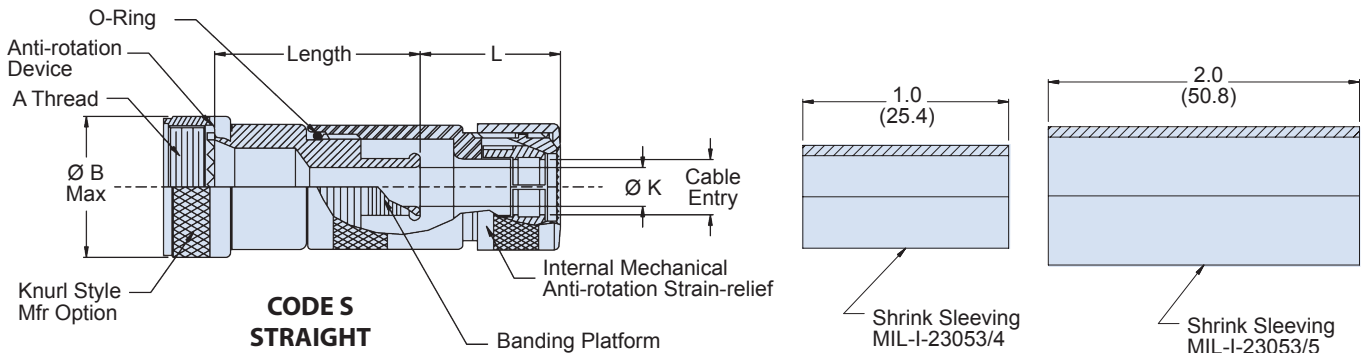
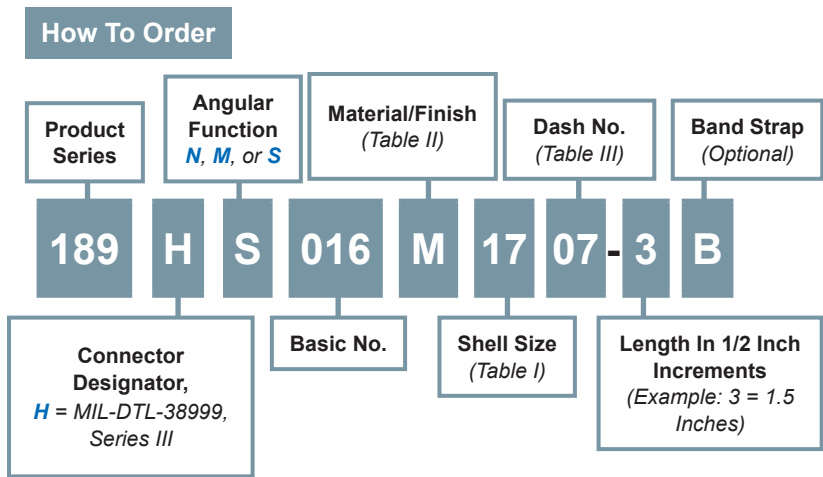


**189-016**  
**Backshell with Banding Strain Relief**  
 Environmental Resistant  
 for MIL-DTL-38999 Series III Fiber Optic Connectors

**D38999**  
Series III

**B**

**MIL-DTL-38999 Series III backshell with strain relief**



**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



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



MIL-DTL-38999  
Series III Type

**B**

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

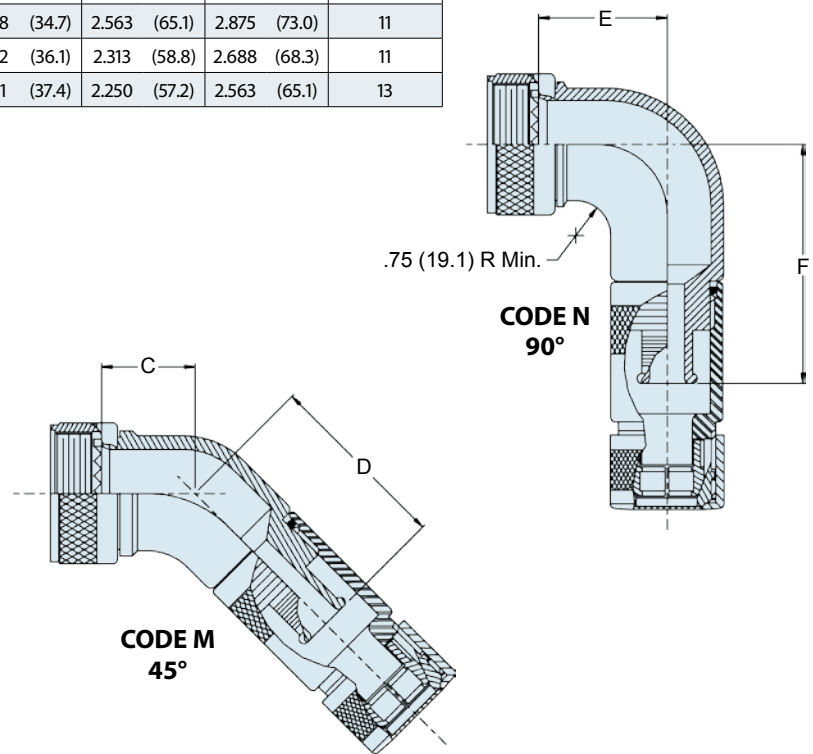


Table III

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)



189-037

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

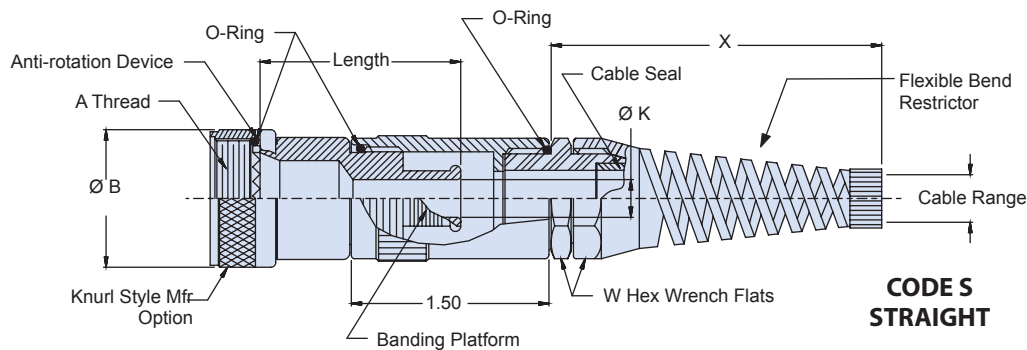
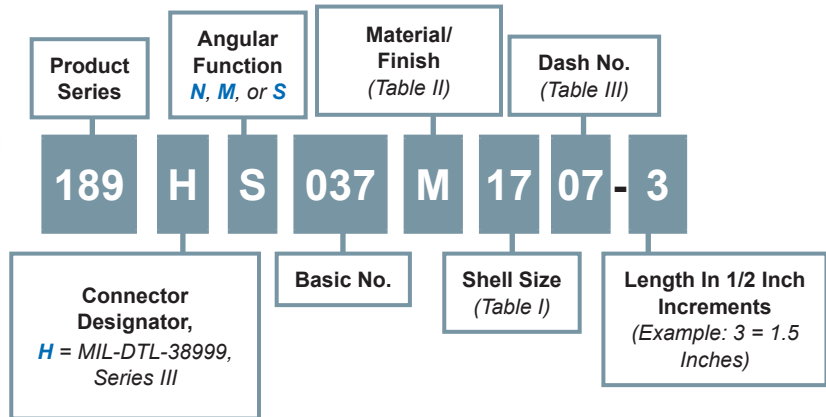
D38999  
Series III

B

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



**How To Order**



**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

189-037

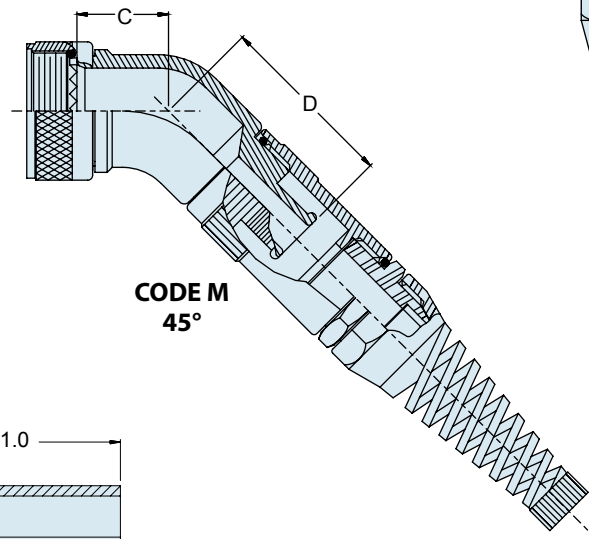
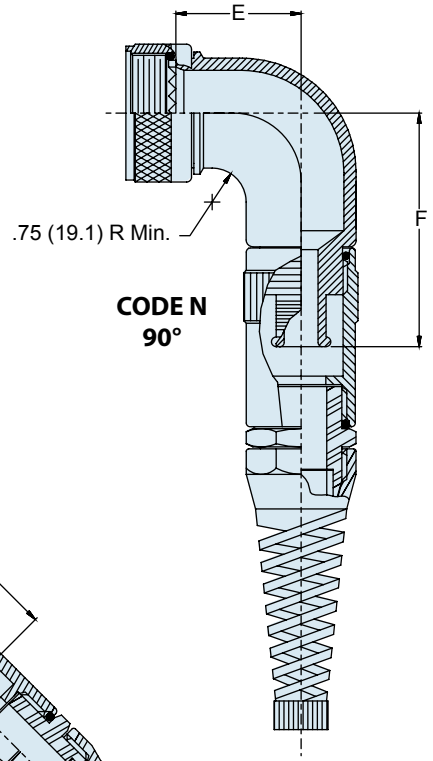
Environmental Backshell with Banding Strain Relief  
for MIL-DTL-38999 Series III Fiber Optic Connectors



MIL-DTL-38999  
Series III Type

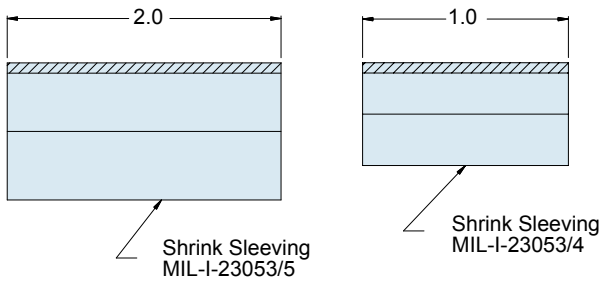
**B**

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)



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

Refer to Appendix for material/finish details



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

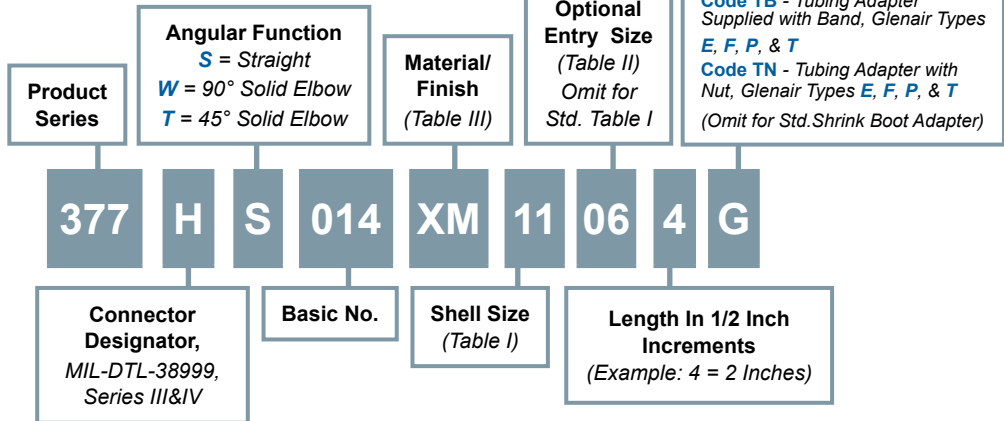
D38999  
Series III

B

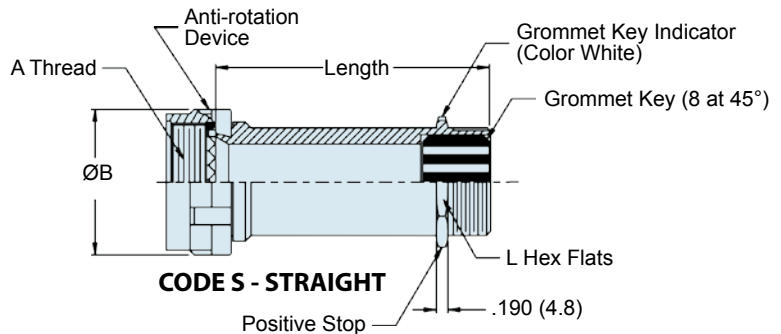
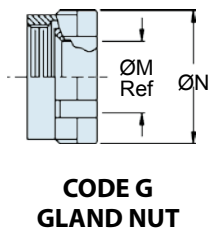
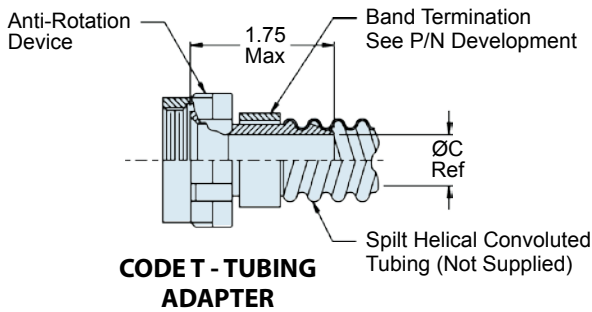
**MIL-DTL-38999 series III & IV backshell**



**How To Order**



**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)



**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.

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



MIL-DTL-38999  
 Series III Type

**B**

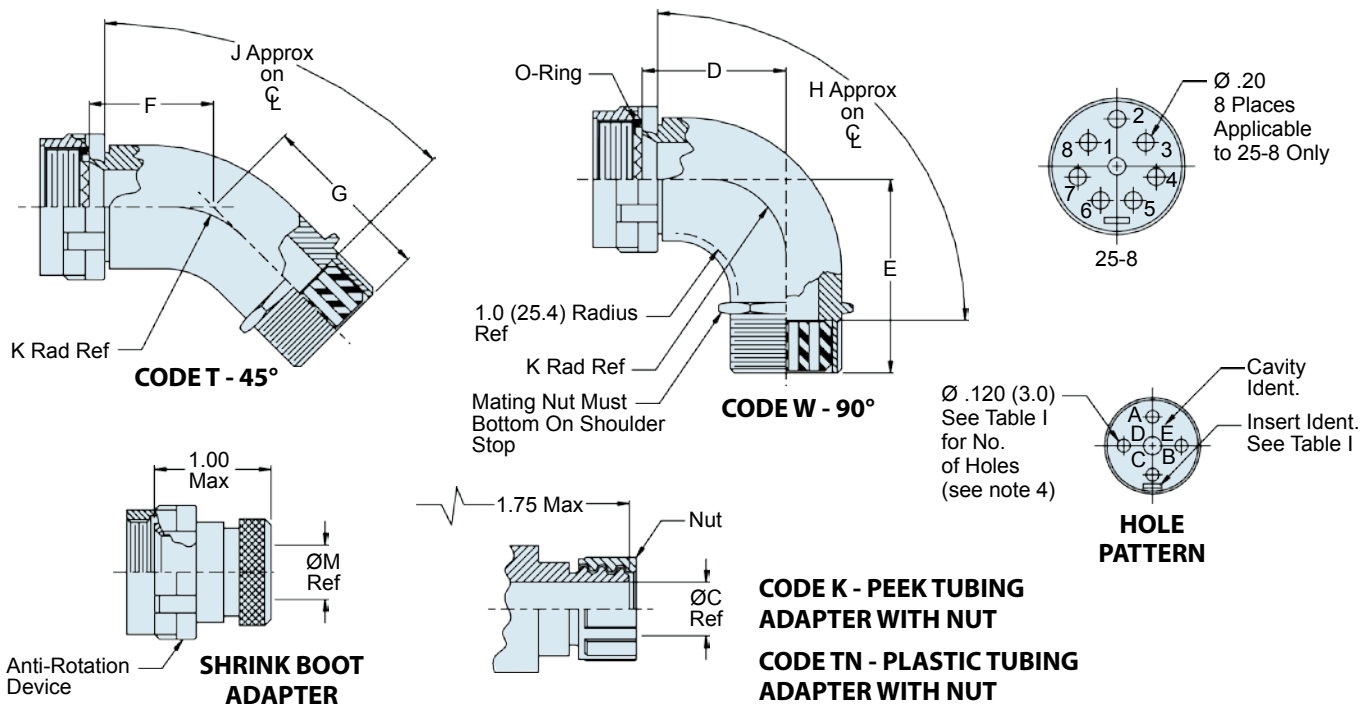


Table I

Shell Size	A Thread	$\phi$ B Max	Std. Conduit Size Ref.	D Max	E Max	F Max	G Max	H Approx	J Approx	K Ref	L Hex	$\phi$ M Ref	$\phi$ N 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	$\phi$ C Ref Code T & TN	$\phi$ C 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	.869	1
17	1.078	1.125	1 1/4

Table III: Material and Finish

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

Refer to Appendix for material/finish details





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

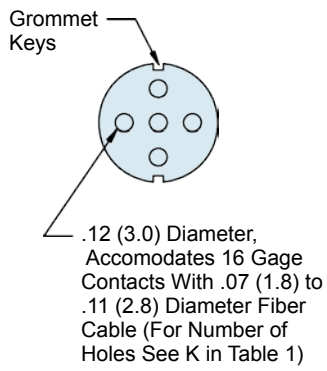
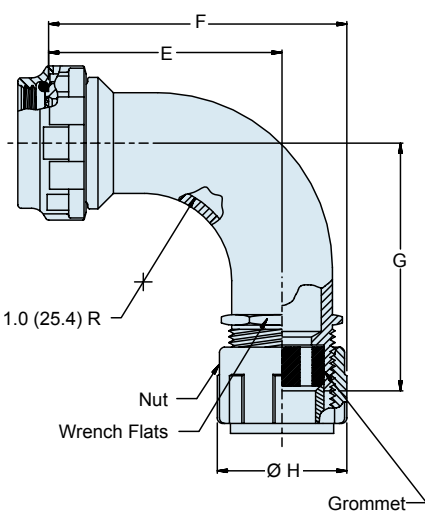
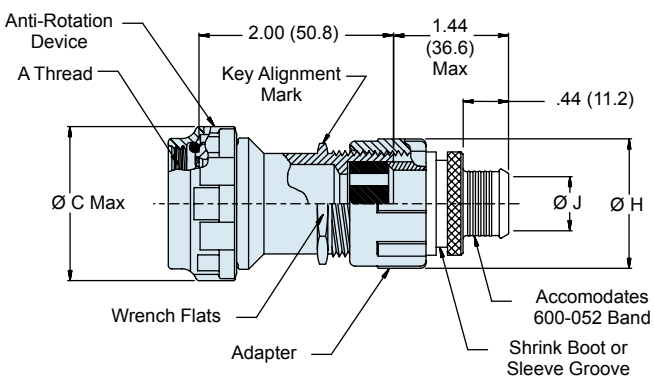
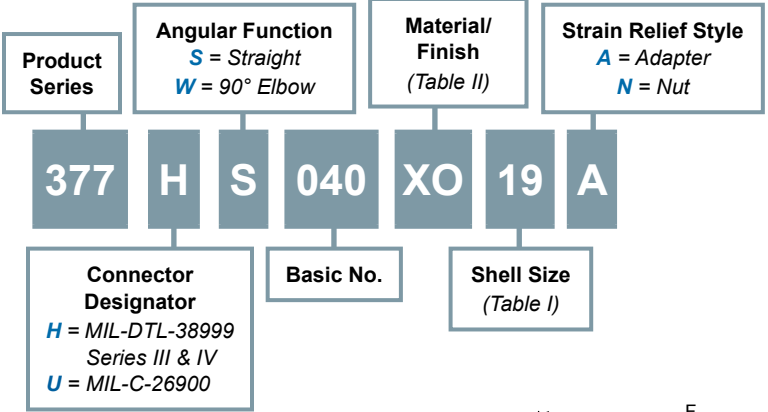
D38999  
Series III

B

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



How To Order



**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.

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



MIL-DTL-38999  
Series III Type

B

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
<b>XB</b>	<b>Composite</b>	No Plating - Black Color
<b>XO</b>		No Plating - Amber Color
<b>XM</b>		Electroless Nickel
<b>XW</b>		Cadmium Olive Drab over Electroless Nickel

Refer to Appendix for material/finish details

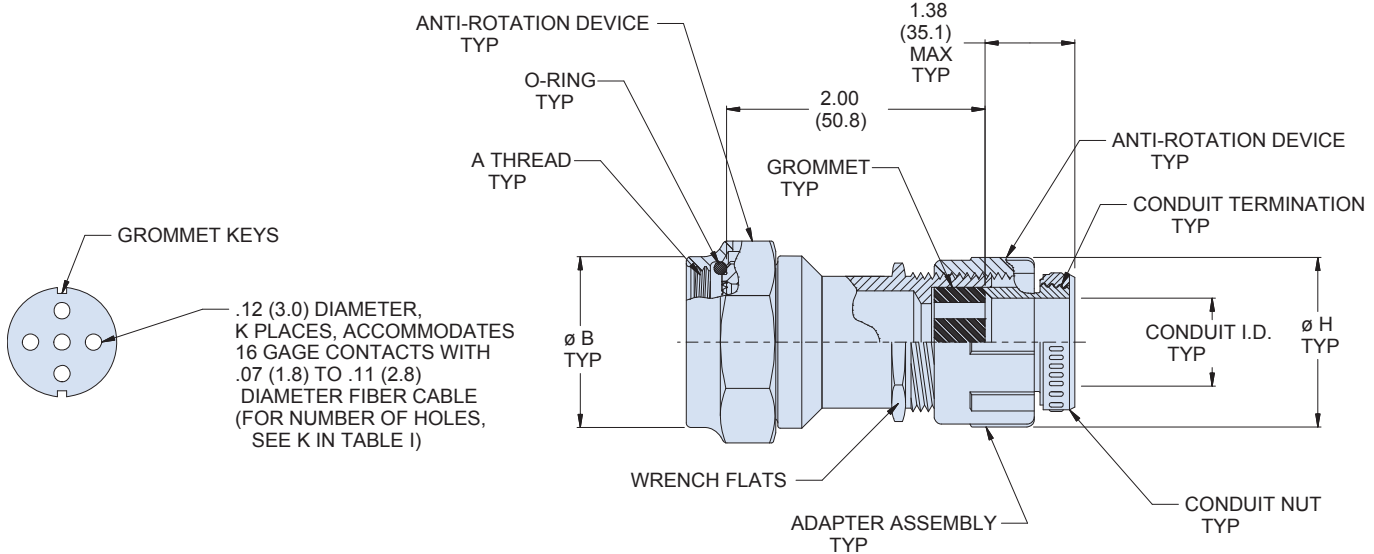
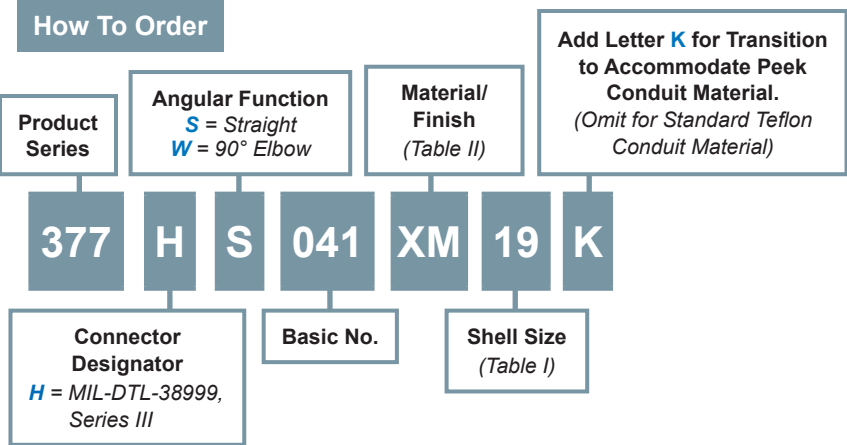


**377-041**  
**Composite FiberCon® Conduit Adapter**  
for Fiber Optic MIL-DTL-38999 Series III Connectors

**D38999**  
Series III

**B**

**MIL-DTL-38999 Series III conduit adapter**



**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 Convuluted Tubing, in accordance with MIL-T-81914.  
For Sealing Plugs, see Glenair drawing 687-142.

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



MIL-DTL-38999  
 Series III Type

**B**

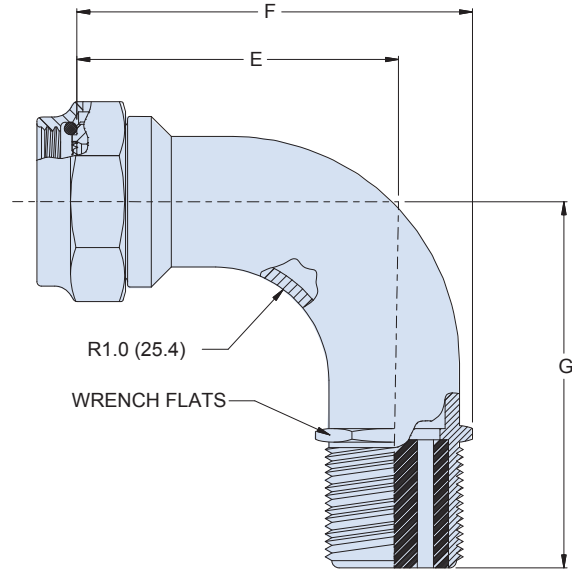
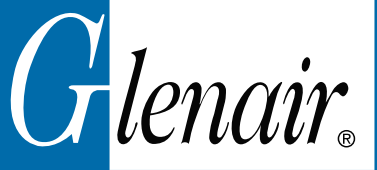


Table I								
Shell Size	A Thread	Ø B Max	E ±.06 (1.5)	F ±.09 (2.3)	G ±.06 (1.5)	Ø H Max	Ø J Ref	K (# Of Holes)
11	M15 X 1 - 6H	.770 (19.6)	1.70 (43.2)	2.39 (60.7)	1.90 (48.3)	1.41 (35.8)	.25 (6.4)	2
13	M18 X 1 - 6H	.890 (22.6)	1.78 (45.2)	2.47 (62.7)	1.96 (49.8)	1.41 (35.8)	.31 (7.9)	4
15	M22 X 1 - 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
<b>XB</b>	<b>Composite</b>	No Plating - Black Color
<b>XO</b>		No Plating - Amber Color
<b>XM</b>		Electroless Nickel
<b>XW</b>		Cadmium Olive Drab over Electroless Nickel

Refer to Appendix for material/finish details



189-038

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

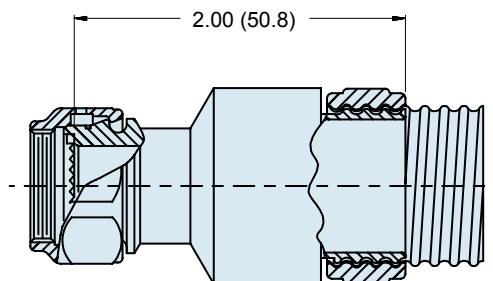
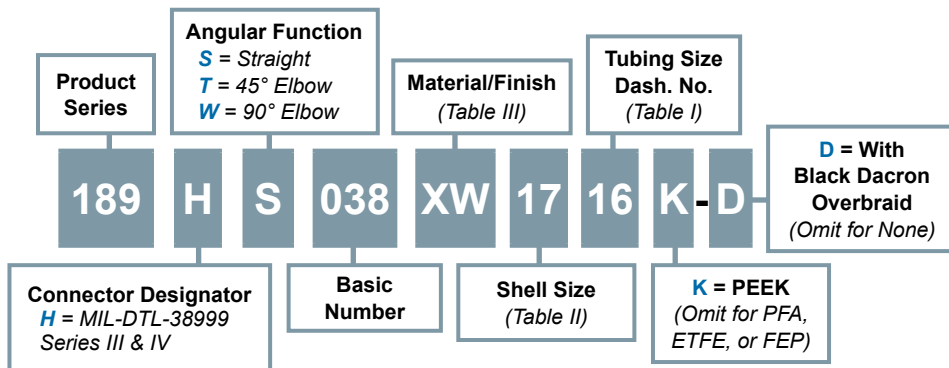
D38999  
Series III

**Composite MIL-DTL-38999 backshell adapter**

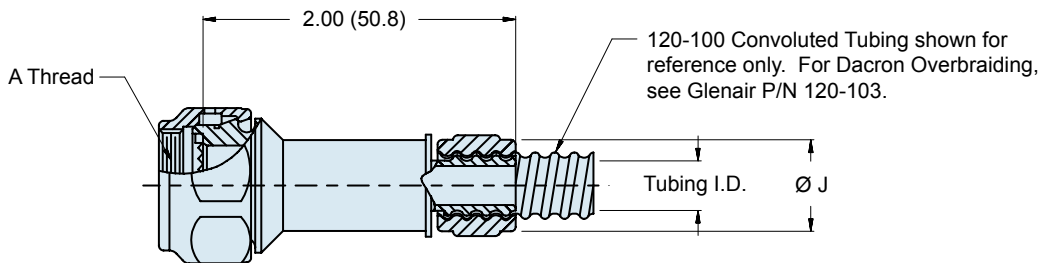
B



**How To Order**



**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



189-038

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



MIL-DTL-38999  
Series III Type

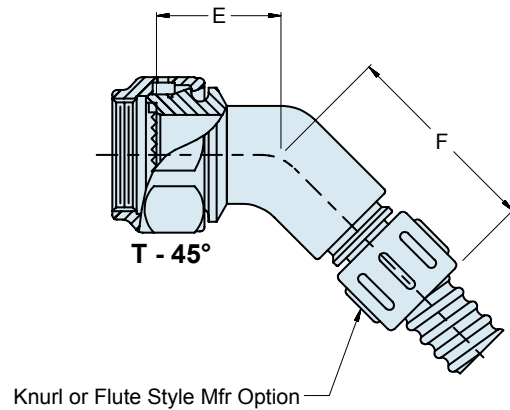
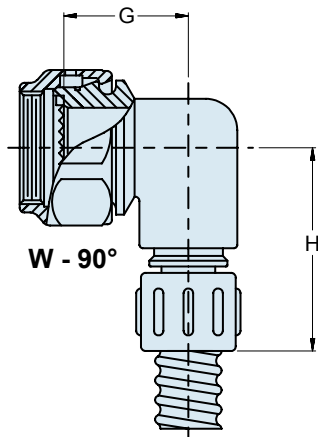
**B**

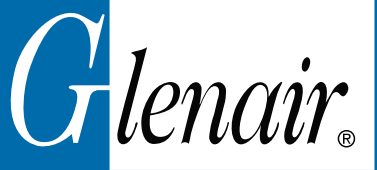
Dash No.	Conduit I.D.	Ø J Max
06	.188 (4.8)	.790 (20.1)
09	.281 (7.1)	.985 (25.0)
10	.312 (7.9)	.985 (25.0)
12	.375 (9.5)	1.035 (26.3)
14	.437 (11.1)	1.100 (27.9)
16	.500 (12.7)	1.160 (29.5)
20	.625 (15.9)	1.285 (32.6)
24	.750 (19.1)	1.480 (37.6)
28	.875 (22.2)	1.670 (42.4)
32	1.000 (25.4)	1.720 (43.7)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

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

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





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

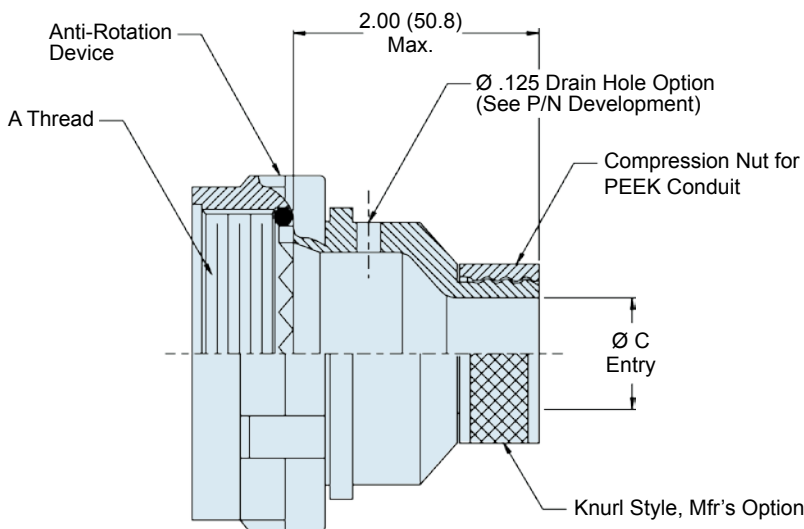
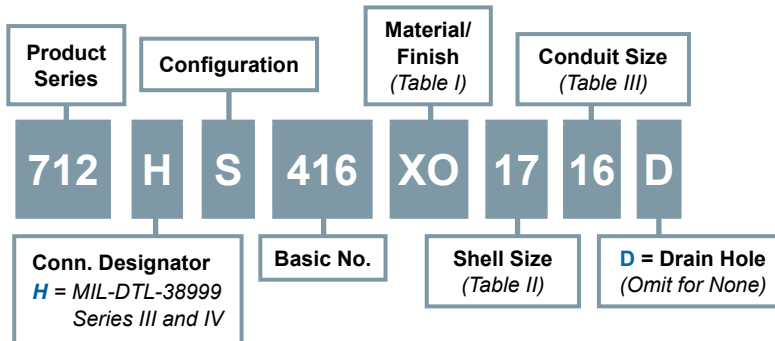


B

MIL-DTL-38999 Series III & IV backshell adapter



How To Order



**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.

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



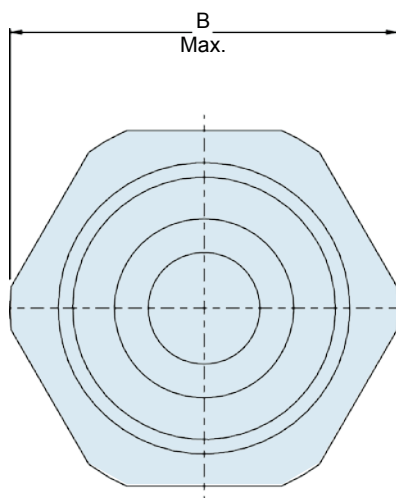
MIL-DTL-38999  
 Series III Type

**B**

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

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)



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)



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

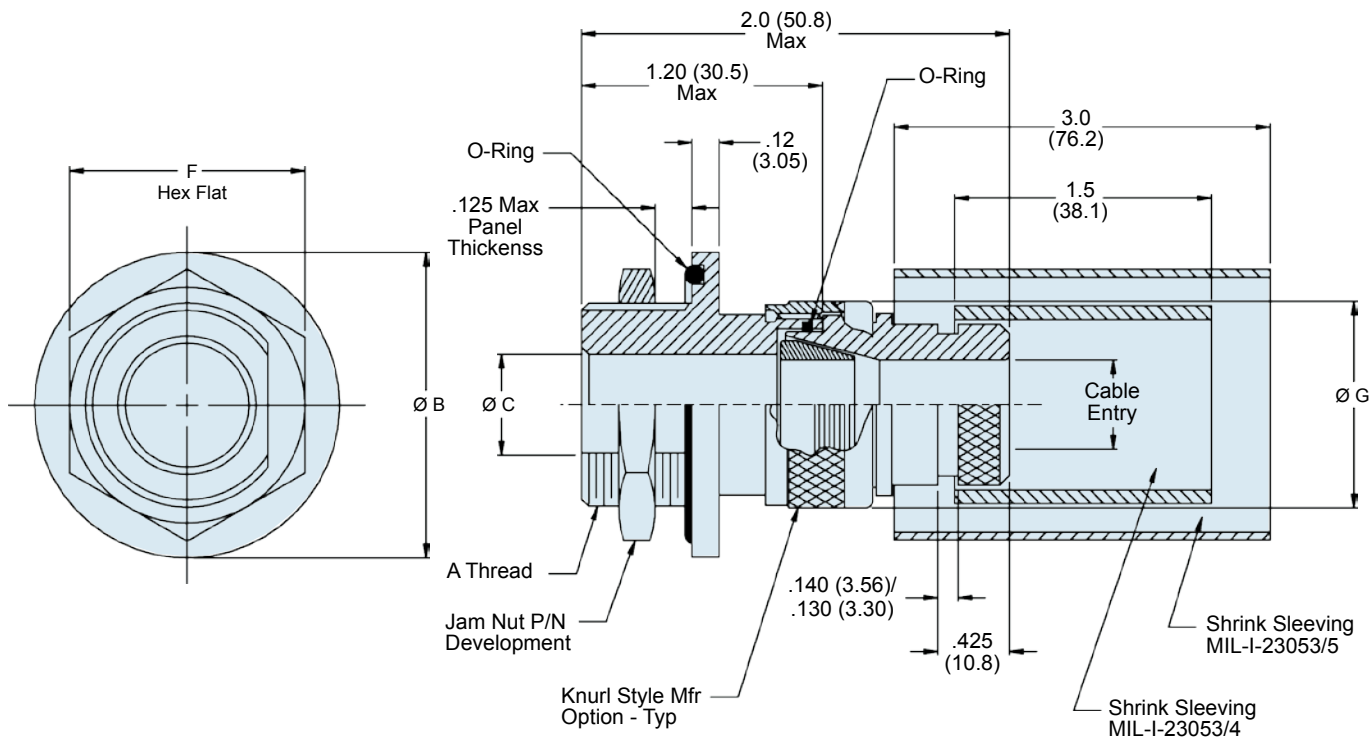
**B**

## Cable bulkhead adapter



**How To Order**

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



### Material and Finish

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

### Notes

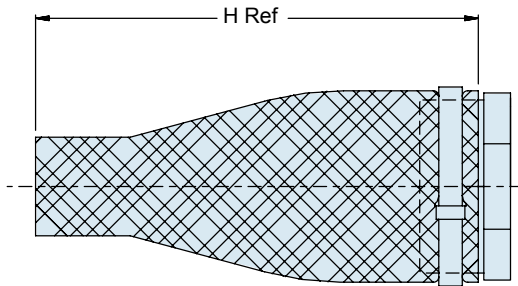
Glenair 600 Series Backshell Assembly Tools are recommended for assembly and installation.  
 MIL-I-23053/4 & /5 Shrink Sleeving to be packaged loose in a plastic bag.

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

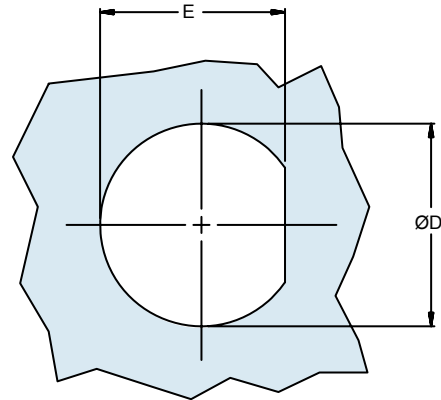


MIL-DTL-38999  
Series III Type

B



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



## 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.

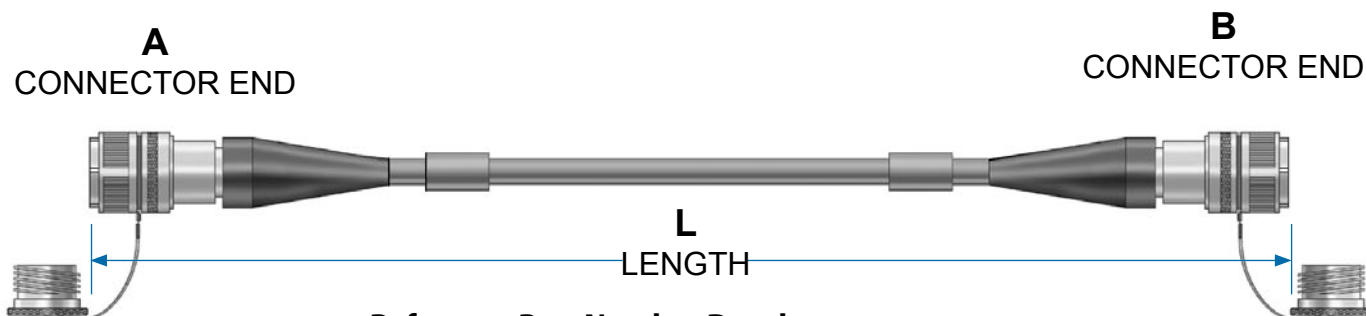
Glenair's ASAP Overmolded Fiber Optic Assemblies are available with our full line of composite thermoplastic and metal alloy connectors. Polyurethane is the applied standard overmolding. For other overmolding material types such as Viton® or Neoprene, please consult the factory. The turnkey assembly 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.

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



MIL-DTL-38999  
 Series III Type

**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

**Protective Covers**

- L = Less Covers
- Omit for with Covers

**Length in Feet**

**Fiber Size**

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

**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)

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.



# 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

B



### Product Features

- FEP (High-Temperature Teflon), 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 (Teflon®) Convolute Tubing Only; Standard Wall Thickness, Standard Convolute
B	PEEK Convolute Tubing Only; Halogen Free, Light Weight
C	FEP Convolute Tubing with Black Dacron Outer Braided Covering
D	PEEK Convolute Tubing with Black Dacron Outer Braided Covering
E	FEP Convolute Tubing with Neoprene Jacket and Black Dacron Outer Braided Covering
F	PEEK Convolute Tubing with Neoprene Jacket and Black Dacron Outer Braided Covering
G	FEP Convolute Tubing with Tin Copper Shielding, Neoprene Jacket and Black Dacron Outer Braided Covering
H	PEEK Convolute Tubing with Tin Copper Shielding, Neoprene Jacket and Black Dacron Outer Braided Covering
J	Brass Metal-Core Conduit, Bronze Braid and Neoprene Jacket

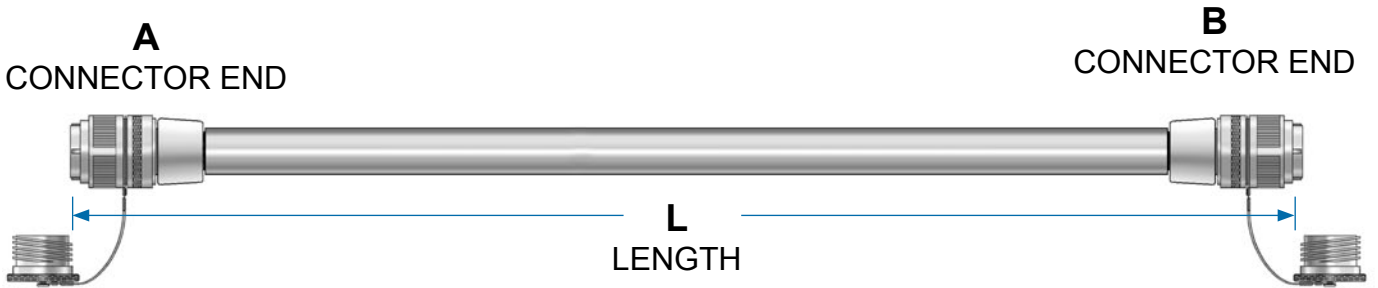
Consult Factory for Other Available Material Types

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



MIL-DTL-38999  
Series III Type

**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

**Protective Covers**

- L = Less Covers
- Omit for with Covers

**Conduit Materials Package (Table I)**

**Length in Feet**

**Fiber Size**

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

**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)

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

\*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.



## 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

B



#### 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 its 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

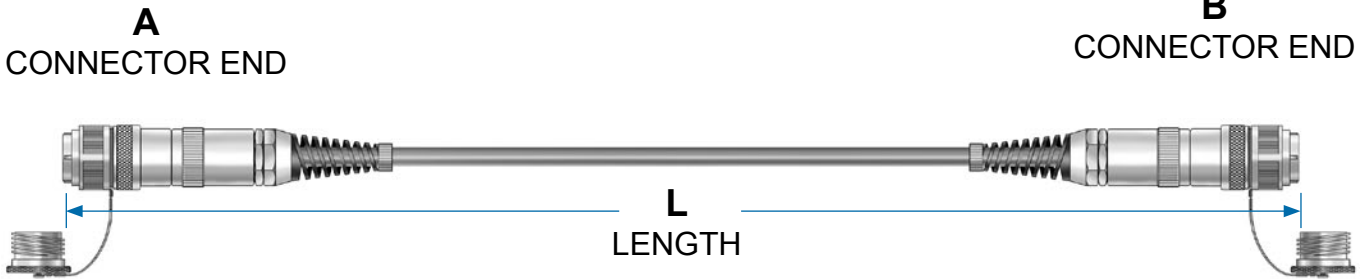


Glenair ASAP Fiber Optic Cable Sets  
 Field Repairable Banding Backshell Assembly  
 D38999 Series III to D38999 Series III



MIL-DTL-38999  
 Series III Type

**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

**Protective Covers**

- L = Less Covers
- Omit for with Covers

**Length in Feet**

**Fiber Size**

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

**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)

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

\*See Page B-12 for Insert Arrangements.

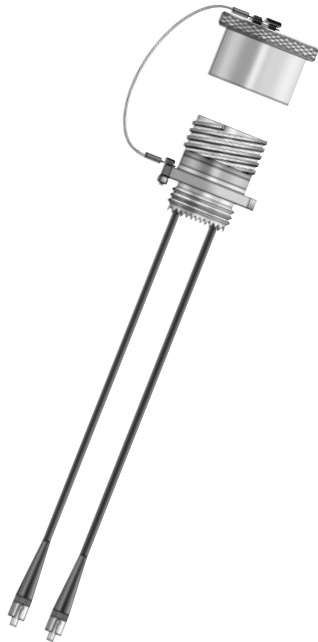
Part Numbering is for Reference Purposes Only. A Unique Glenair Part Number Will Be Assigned to Your Cable Order.



## 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

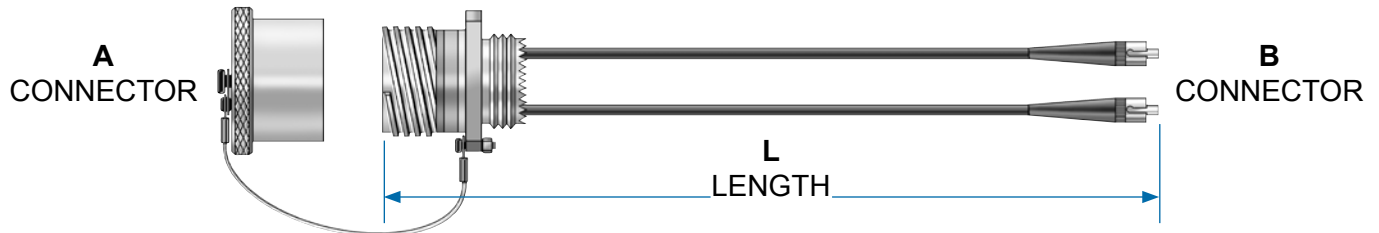
The packaging and layout of a fiber optic interconnect assembly can vary widely depending on the application environment. Fiber optics deployed in military avionics, for example, may take the form of a Mil-Spec receptacle and simplex pigtail connector assembly when fiber is used to interconnect the optical 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.

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



MIL-DTL-38999  
 Series III Type

**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

**Protective Covers**

- L = Less Covers
- Omit for with Covers

**Length in Inches**

- 6 Inch Minimum

**Fiber Size**

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

**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)

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.

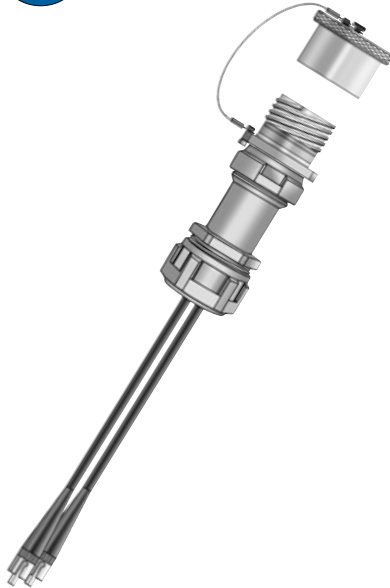


## Glenair ASAP Fiber Optic Cable Sets Inside-the-Box Receptacle/Pigtail Assembly with FiberCon® Backshell D38999 Series III to ST, FC, SC, LC & SMA

D38999  
Series III

### ASAP fiber optic cable sets

B

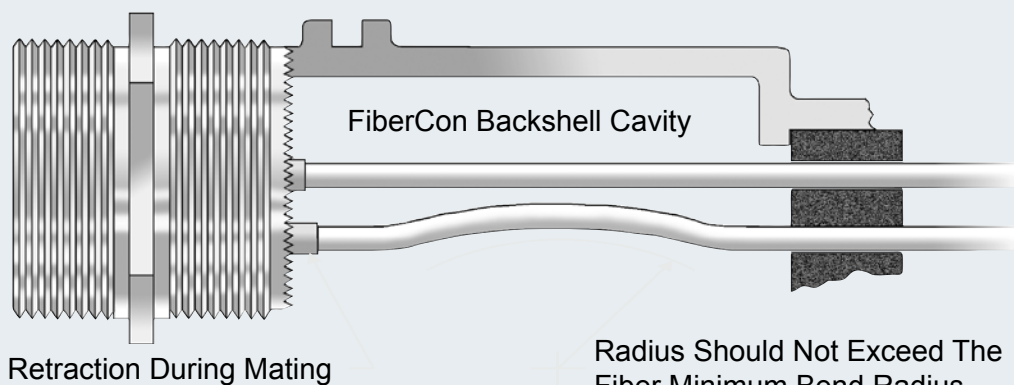


#### Product Features

- 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

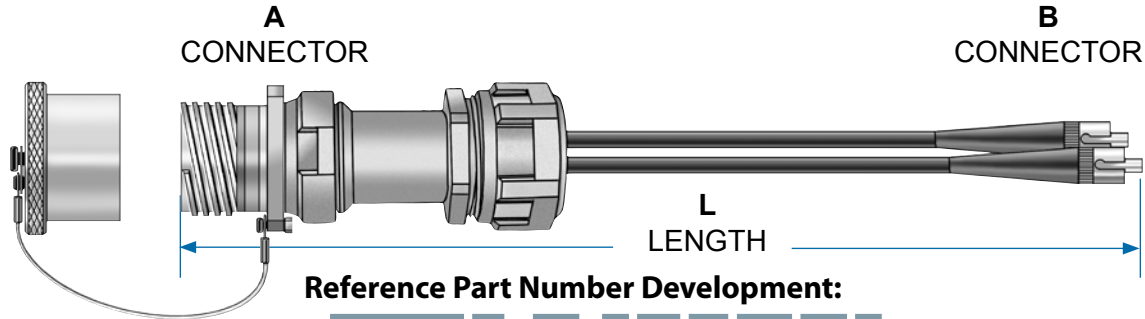
Glenair can supply receptacle/pigtail assemblies with a FiberCon® Backshell that protects fiber terminations and insures exact alignment of the fiber optic termini. The grommeted backshell design prevents micro-bending of the fibers while providing optimum strain relief to the overall cable. The unique 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.

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



MIL-DTL-38999  
Series III Type

**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

**Protective Covers**

- L = Less Covers
- Omit for with Covers

**Length in Inches**

- 6 Inch Minimum

**Fiber Size**

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

**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)

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.



## 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

B



#### 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.

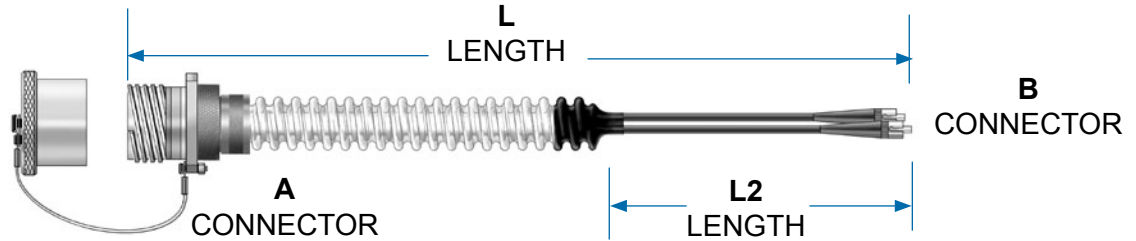


**Glenair ASAP Fiber Optic Cable Sets**  
**Inside-the-Box Receptacle/Pigtail Assembly**  
 with Low-Profile Backshell and Conduit  
 D38999 Series III to ST, FC, SC, LC & SMA



MIL-DTL-38999  
 Series III Type

**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

**Protective Covers**

- L = Less Covers
- Omit for with Covers

**"L2" Length in Inches**

**"L" Length in Feet**

- 6 Inch Minimum

**Fiber Size**

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

**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)

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.



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

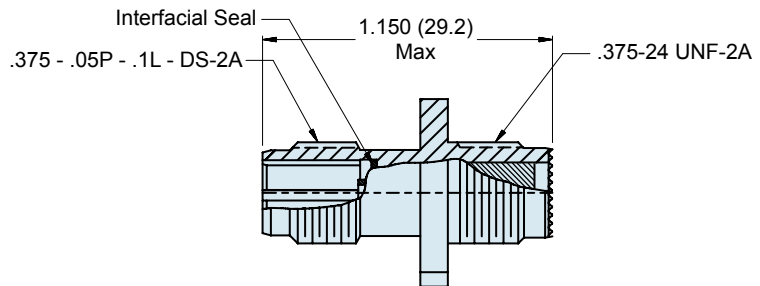
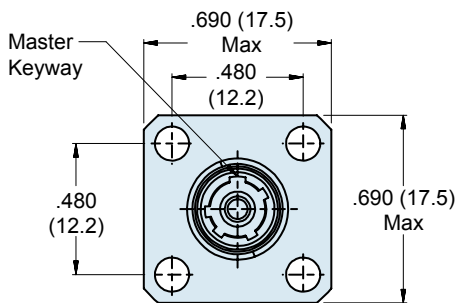
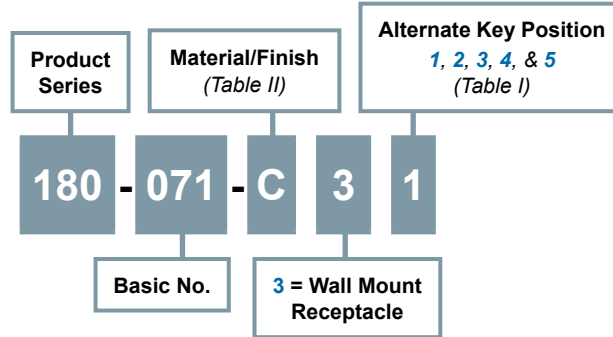
**D38999**  
Series III

**B**

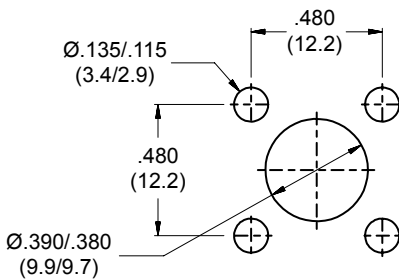
**Single channel fiber optic square flange wall mount receptacle connector**



**How To Order**



**-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**

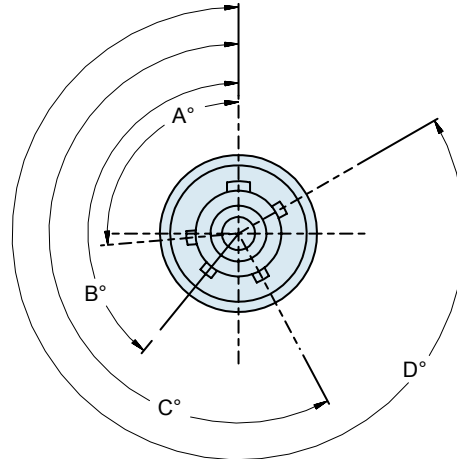
Operating Temperature Range: -55°C to +125°C.  
See Glenair drawing 181-002 for fiber optic pin terminus.

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



MIL-DTL-38999  
Series III Type

**B**



**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



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

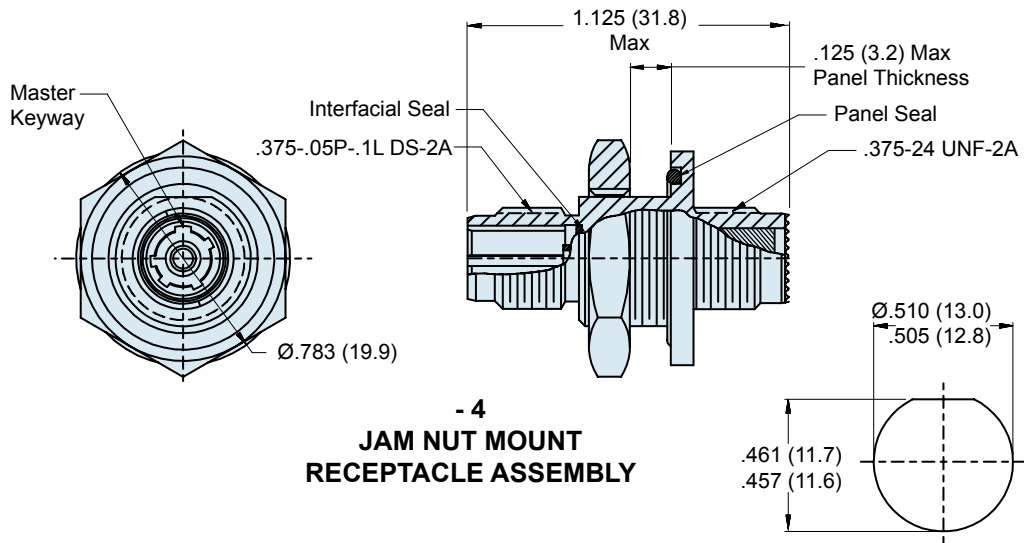
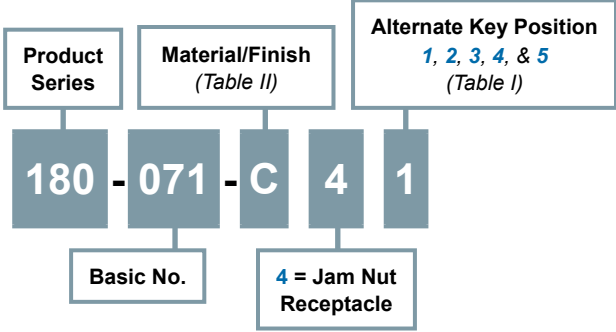
**D38999**  
Series III

**B**

**Single channel fiber optic jam nut mount receptacle connector**



**How To Order**



**Material and Finish**

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

**Notes**

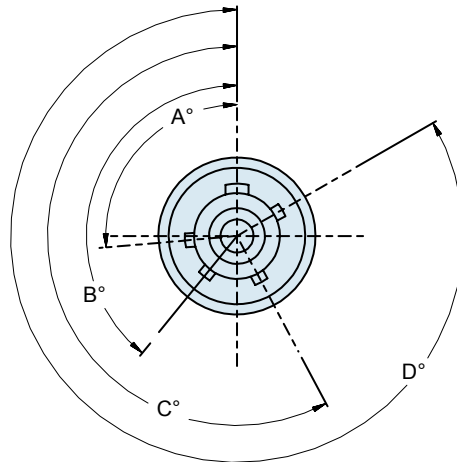
Operating Temperature Range: -55°C to +125°C  
See Glenair drawing 181-002 for fiber optic pin terminus.

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



MIL-DTL-38999  
Series III Type

**B**



**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



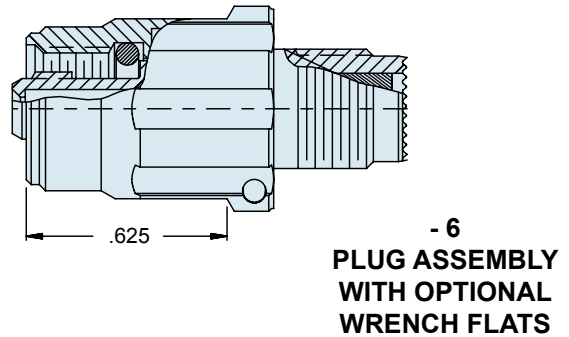
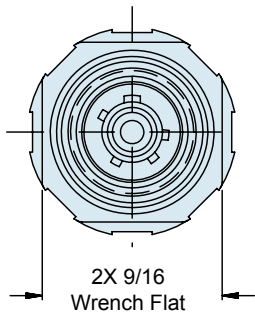
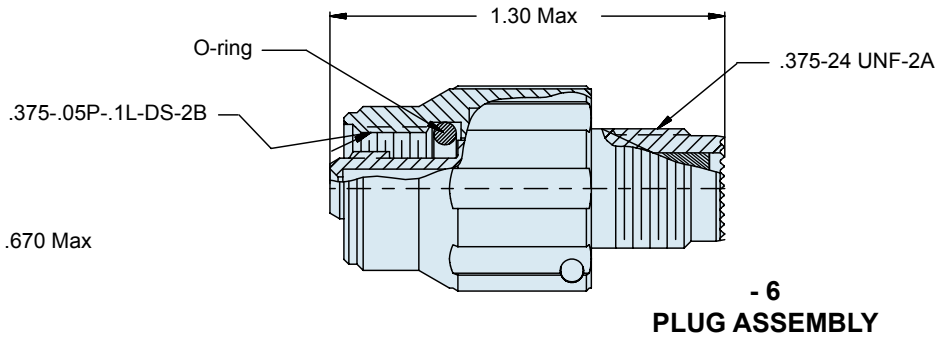
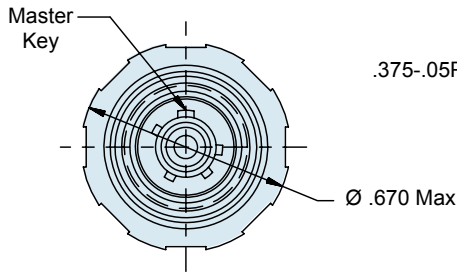
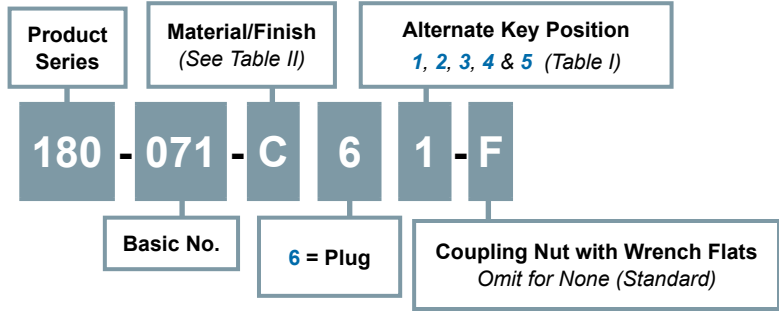
**180-071 (-6) Plug**  
**Single Channel Fiber Optic Connector**  
 Environmental Resistant  
 for Glenair 181-001 Rear Release Socket Termini

**Single channel fiber optic plug connector**

**B**



**How To Order**



**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.

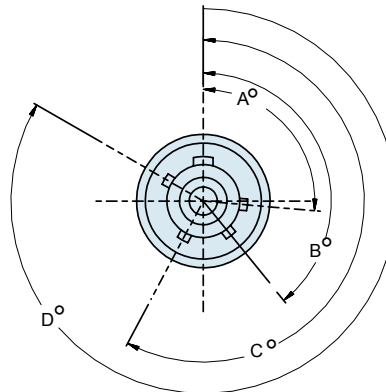


**180-071 (-6) Plug**  
**Single Channel Fiber Optic Connector**  
**Environmental Resistant**  
**for Glenair 181-001 Rear Release Socket Termini**



MIL-DTL-38999  
 Series III Type

**B**



**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
ZI	Stainless Steel	Passivate

Refer to Appendix for material/finish details

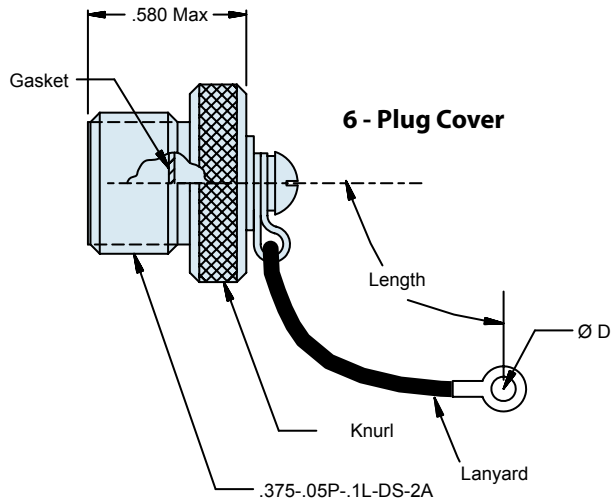
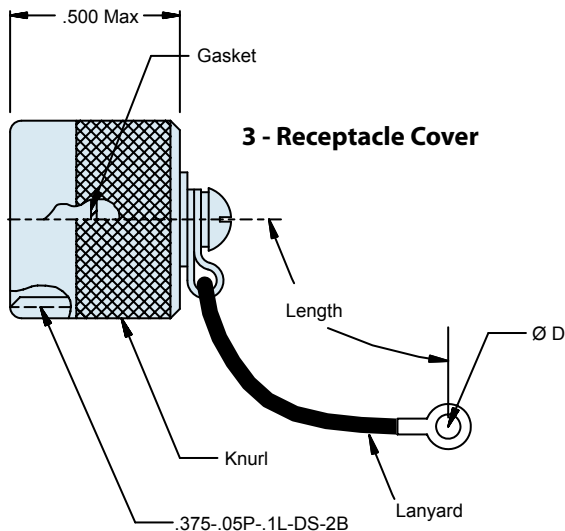
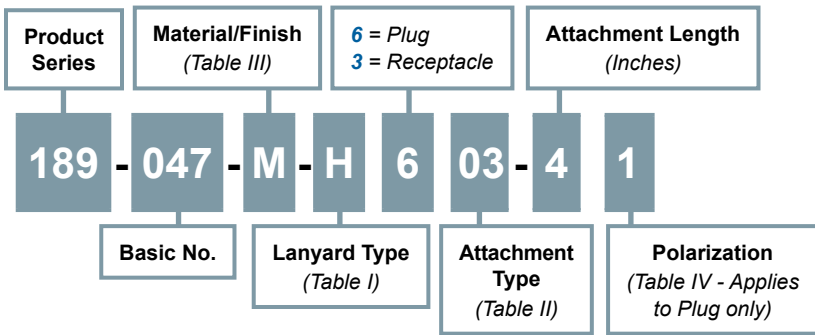


**189-047**  
**Plug and Receptacle Protective Covers**  
for Single Channel 180-071 Series Fiber Optic Connectors

**Plug and receptacle protective covers for single channel fiber optic connectors**

**B**

**How To Order**



**Material and Finish**

Cover: See Table III  
Gasket: Fluorosilicone

189-047

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



MIL-DTL-38999  
Series III Type

**B**

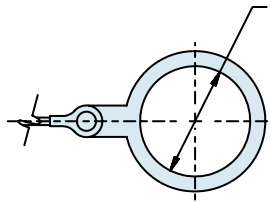
**Table I: Lanyard Codes**

Code	Description
D	Bead Chain, CRES, Passivated
F	Wire Rope, Nylon Jacket
G	Nylon Rope, Black
H	Wire Rope, Teflon 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

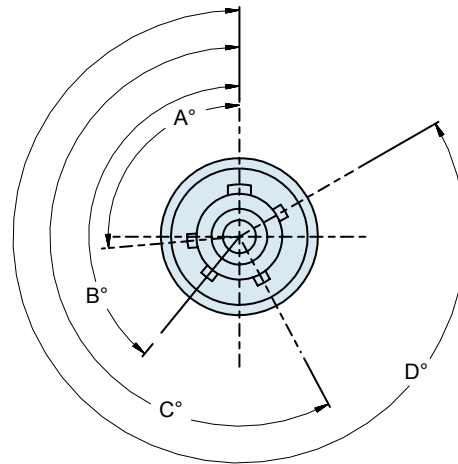
**Table III: Material and Finish**

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)**

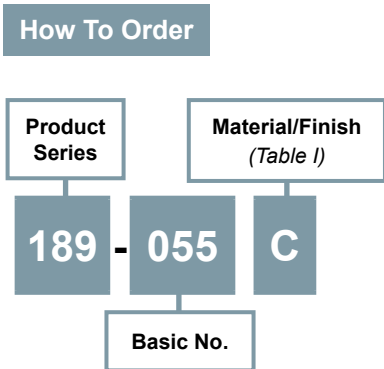
Pos	A°	B°	C°	D°
1	95	141	208	300
2	80	141	208	300
3	95	141	223	300
4	80	141	223	300
5	95	141	208	275



**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**

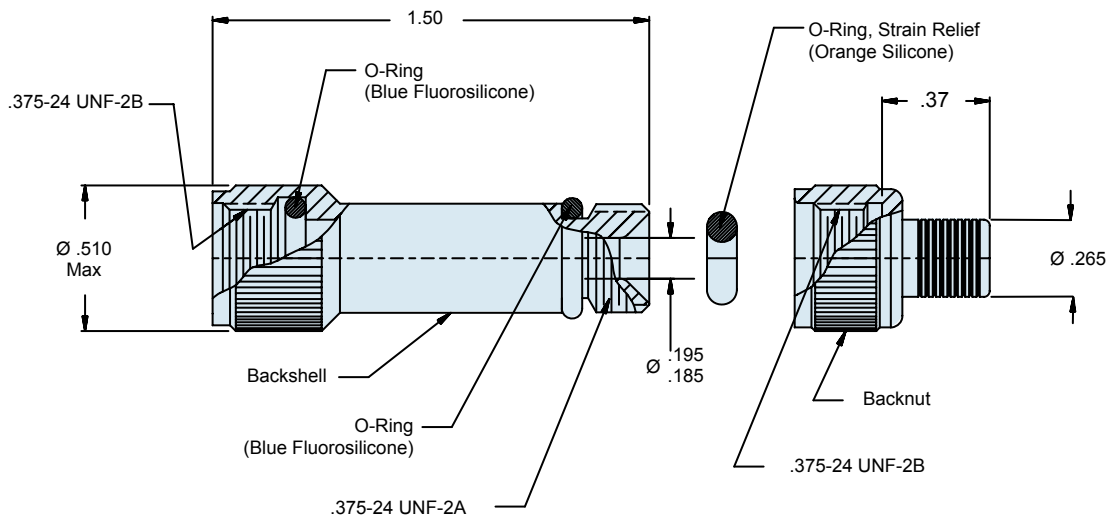
**B**



**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

**180-076 Fiber Optic Splice**  
 For use with Glenair 180-001 and 181-002 Rear Release Termini  
 Type Connectors



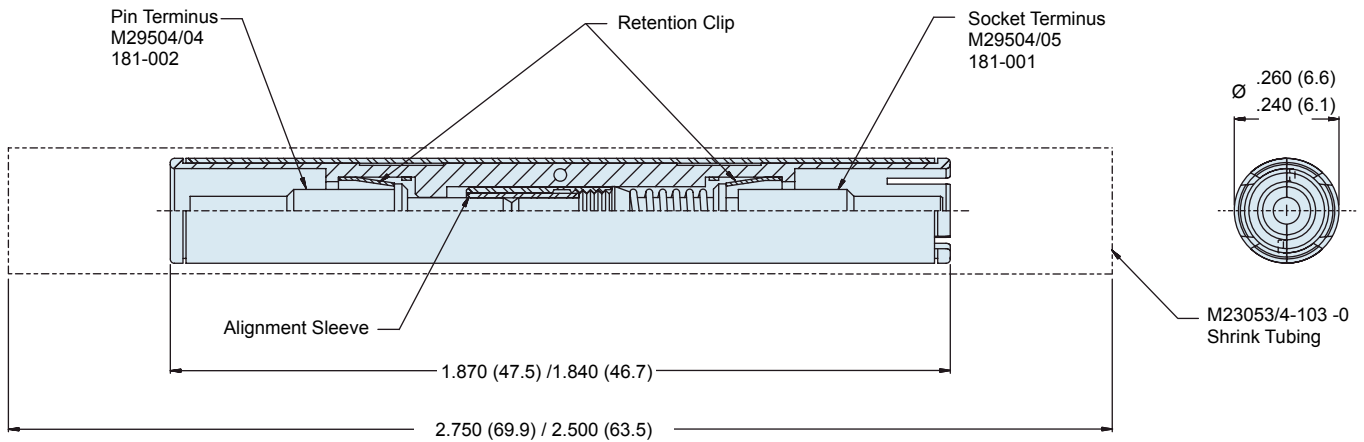
MIL-DTL-38999  
 Series III Type

**Fiber optic splice**



Part Number	Description
180-076	Fiber Optic Splice

**B**



**Material and Finish**

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



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

**D38999**  
Series III

**B**

**2 Channel fiber optic receptacle connector**

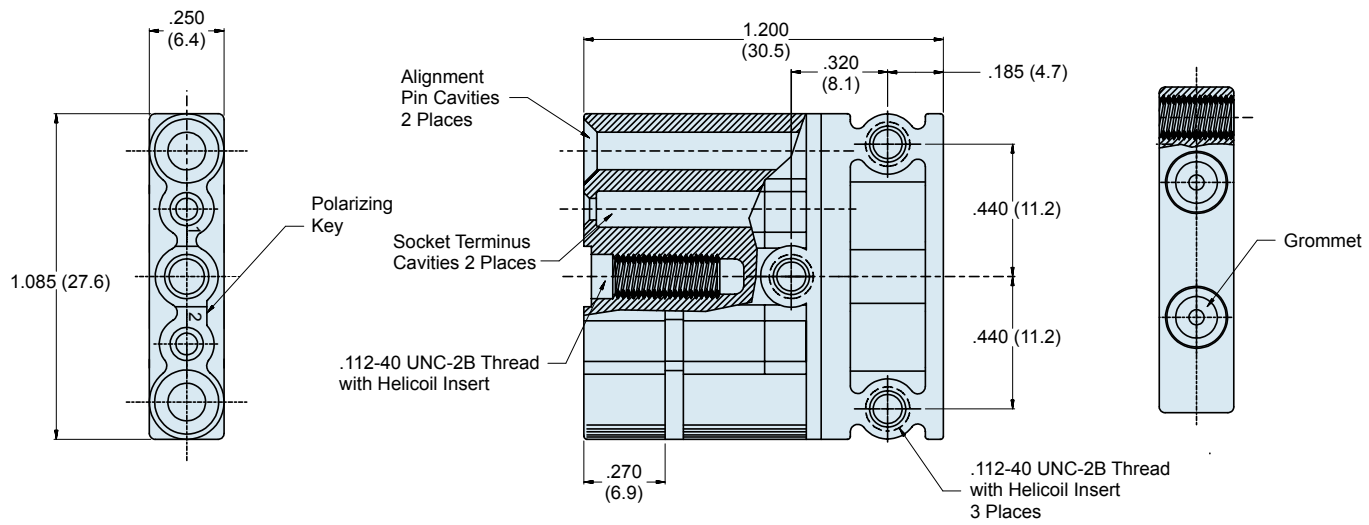
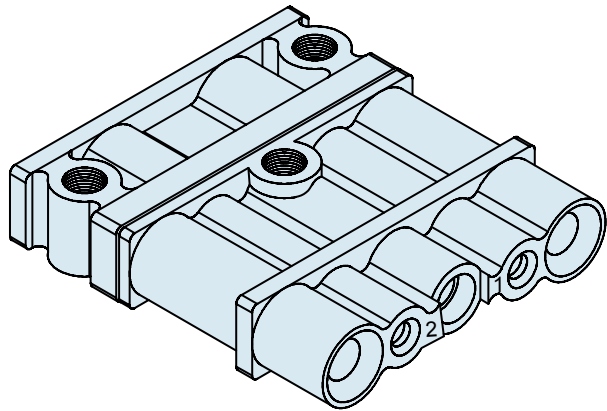


**How To Order**

**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.



180-053  
2 Channel Fiber Optic Plug Connector  
for M29504/04 Pin Terminus



MIL-DTL-38999  
Series III Type

2 Channel fiber optic plug connector

B

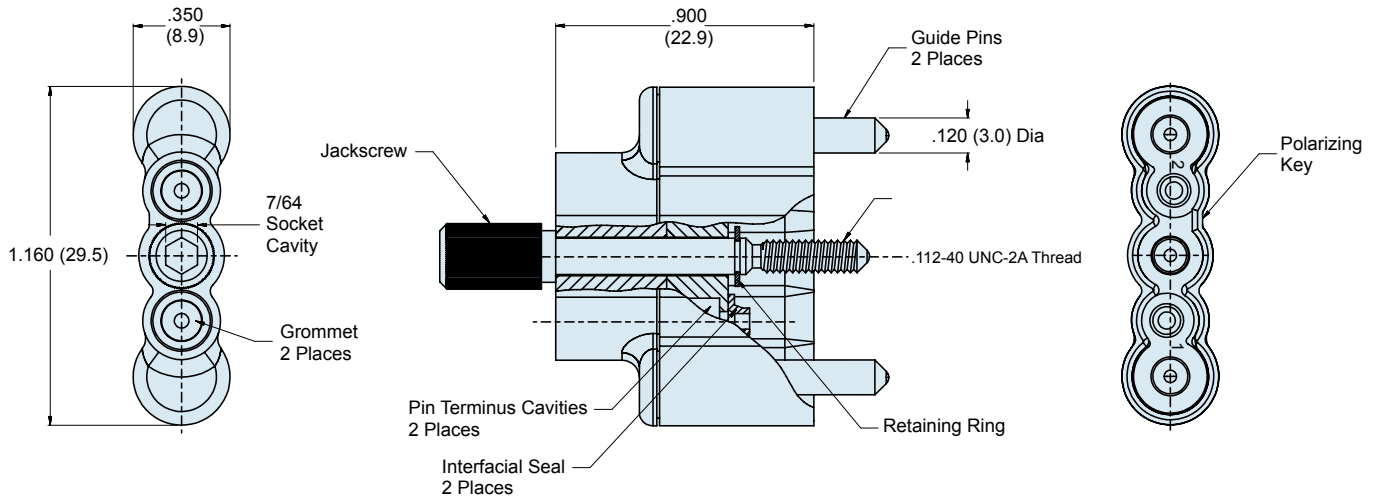
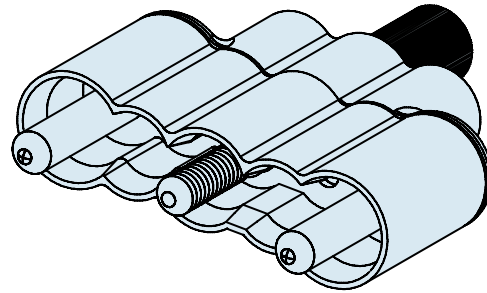


How To Order

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.

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 achieved with an innovative Front Release terminus design and accommodation for M85045/16 cable.



## GHD • Glenair High Density Fiber Optic Connection System General Information



### **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.
<b>Fiber Optic Termini</b>		
<b>181-056</b>	Non-keyed Front Release Terminus , Size 18 Genderless Pin	C-2
<b>181-047</b>	Keyed Front Release Terminus for APC Polish, Size 18 Genderless Pin	C-3
<b>181-058</b>	Dummy Terminus, Front Release, Size 18	C-4
<b>Fiber Optic Connectors</b>		
<b>180-122 (05)</b>	In-Line Receptacle Connector	C-6
<b>180-122 (H7)</b>	Square Flange Receptacle Connector with Round Holes (standard)	C-8
<b>180-122 (S7)</b>	Square Flange Receptacle Connector with Slotted Holes	C-10
<b>180-122 (08)</b>	Jam Nut Mount Receptacle Connector	C-12
<b>180-122 (06)</b>	Plug Connector with Alignment Sleeve Retainer (ASR)	C-14
<b>180-122ASR</b>	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°



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



**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 achieved with an innovative front release terminus design and accommodation for M85045/16 cable. The genderless Size 18 GHD terminus delivers nearly double the density of M28876 and D38999 with superior optical performance.

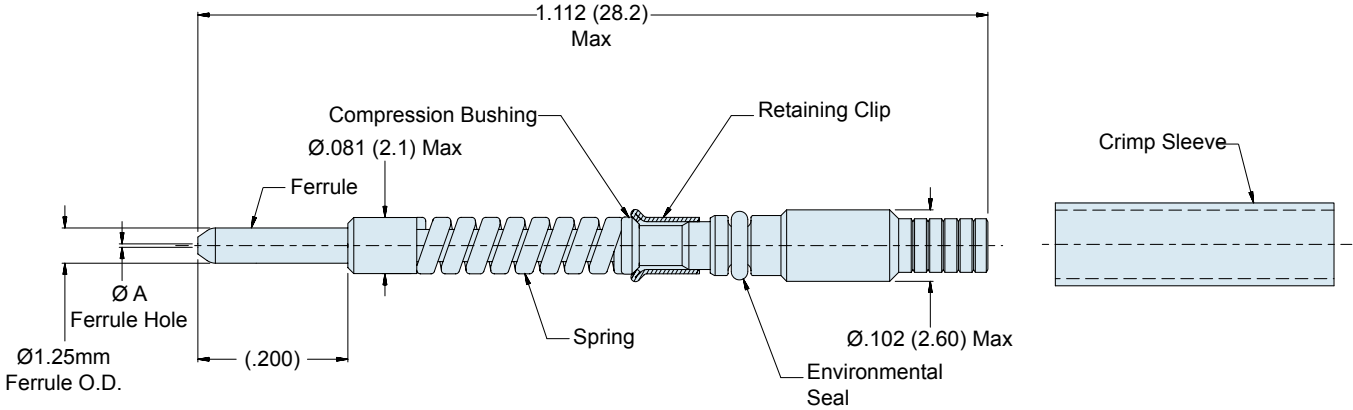


Table I: Dash Number		
Assembly Dash Number	Ø A Microns	Fiber Type
<a href="#">181-056-1250C</a>	125.0	SM
<a href="#">181-056-1255C</a>	125.5	SM
<a href="#">181-056-1260C</a>	126.0	SM & MM
<a href="#">181-056-1270C</a>	127.0	MM
<a href="#">181-056-1420C</a>	142.0	MM
<a href="#">181-056-1450C</a>	145.0	MM
<a href="#">181-056-1560C</a>	156.0	MM
<a href="#">181-056-1570C</a>	157.0	MM
<a href="#">181-056-1730C</a>	173.0	MM
<a href="#">181-056-1750C</a>	175.0	MM
<a href="#">181-056-2360C</a>	236.0	MM
<a href="#">181-056-2860C</a>	286.0	MM
<a href="#">181-056-4480C</a>	448.0	MM

Consult factory for additional sizes  
SM = Singlemode  
MM = Multimode

Table II: Accessories	
Part Number	Description
<a href="#">265-002</a>	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.

181-047

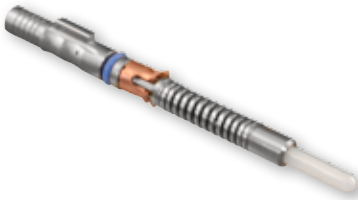
**GHD • Glenair High Density  
Fiber Optic Genderless Terminus  
Size 18 Keyed Terminus for APC Polish**



Glenair High Density  
Fiber Optic System



**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 terminus is .3 dB). Dense cavity spacing is achieved with an innovative front release terminus design and accommodation for M85045/16 cable. The 181-047 version is equipped with a single keying feature for APC polish.

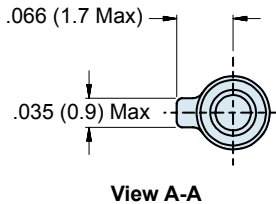
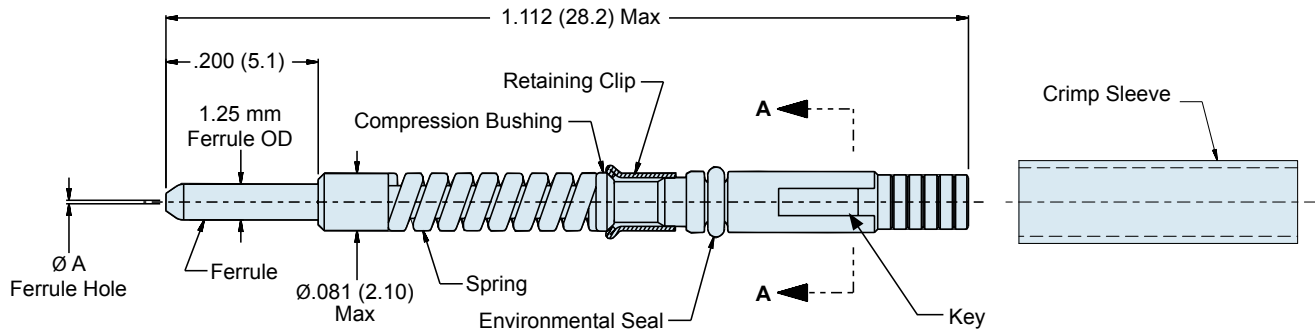


Table I: Dash Number		
Assembly Dash Number	Ø A Microns	Fiber Type
181-047-1250C	125.0	SM
181-047-1255C	125.5	SM
181-047-1260C	126.0	SM & MM
181-047-1270C	127.0	MM
181-047-1420C	142.0	MM
181-047-1450C	145.0	MM
181-047-1560C	156.0	MM
181-047-1570C	157.0	MM
181-047-1730C	173.0	MM
181-047-1750C	175.0	MM
181-047-2360C	236.0	MM
181-047-2860C	286.0	MM
181-047-4480C	448.0	MM

Consult factory for additional sizes  
SM = Singlemode  
MM = Multimode

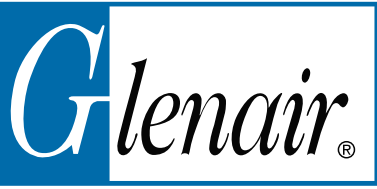
Table II: Accessories	
Part Number	Description
265-002	Crimp Sleeve, Ø2.2mm Max Jacket

**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. **181-047-1260**)  
See Glenair assembly procedure GAP-032 for termination and assembly tools/procedures..



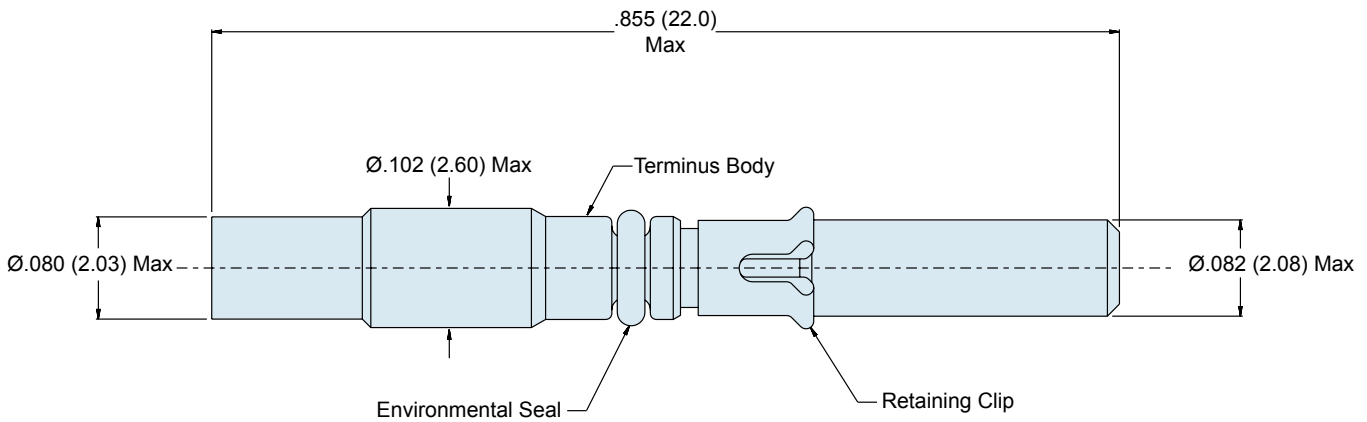
**181-058**  
**GHD • Glenair High Density**  
**Size 18 Dummy Terminus**



**GHD Size 18 dummy terminus**



Part Number	Description
181-058	Dummy Terminus, size 18



**Material and Finish**

Terminus Body: Stainless Steel/Passivate

Retaining Clip: Spring Alloy

Environmental Seal: Fluorosilicone

See GAP-032 for assembly tools/procedures.

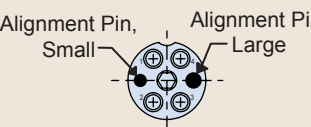
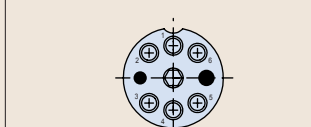
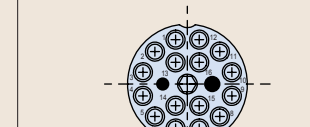
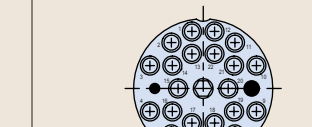
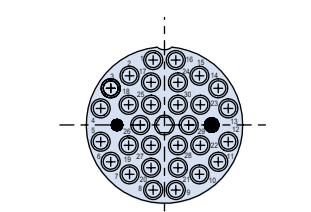
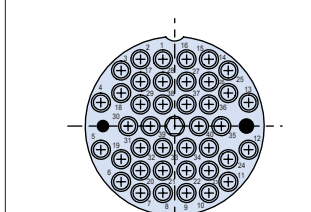
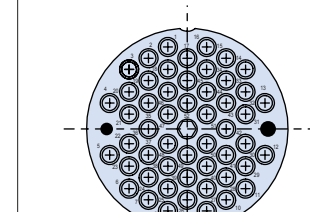
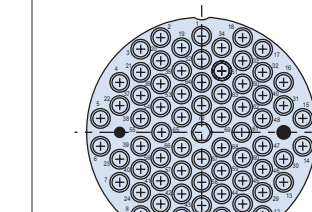


180-122  
**GHD • Glenair High Density  
 Fiber Optic Connection System**  
 Materials and Finishes • Insert Arrangements



**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 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
ZI		Passivate

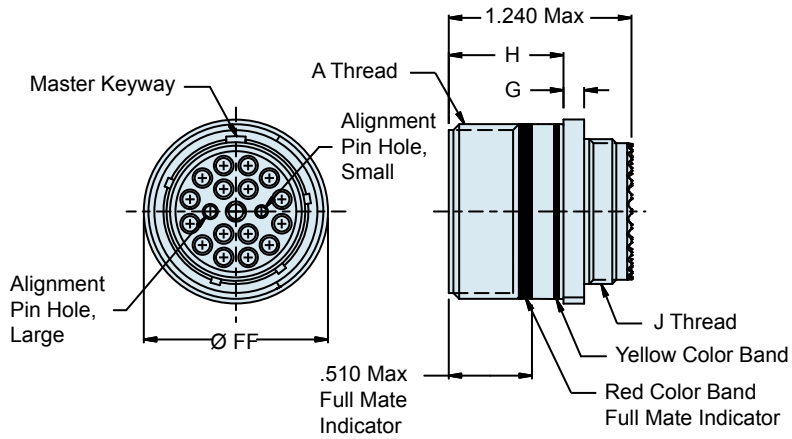
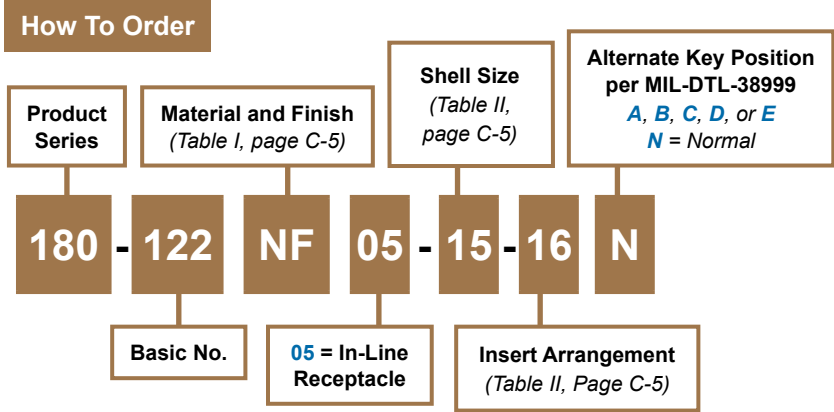
Table II: Insert arrangements			
 <p>Alignment Pin, Small            Alignment Pin, Large</p> <p>Shell Size 11            Arrangement 4</p>	 <p>Shell Size 13            Arrangement 6</p>	 <p>Shell Size 15            Arrangement 16</p>	 <p>Shell Size 17            Arrangement 22</p>
 <p>Shell Size 19            Arrangement 30</p>	 <p>Shell Size 21            Arrangement 40</p>	 <p>Shell Size 23            Arrangement 52</p>	 <p>Shell Size 25            Arrangement 70</p>
<p>Plug face marking with removable alignment sleeve retainer (ASR) shown. Receptacle face - opposite.            ASR includes two guide pins and a threaded center jackscrew.</p>			



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



**GHD In-line receptacle connector**



**05 - In-Line Receptacle**

**Material and Finish**

Shell: See Table I, Page C-5.

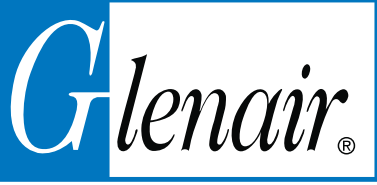
Insert: High grade rigid dielectric, or Al Alloy/anodized - MFR's option

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



**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)



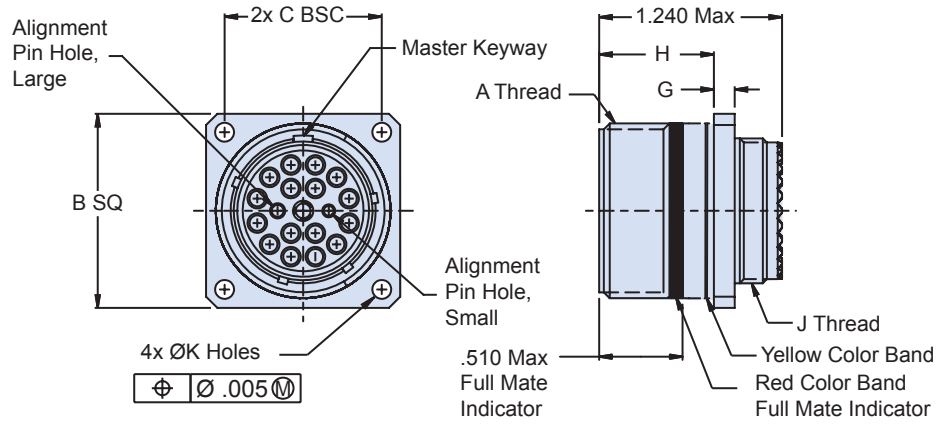
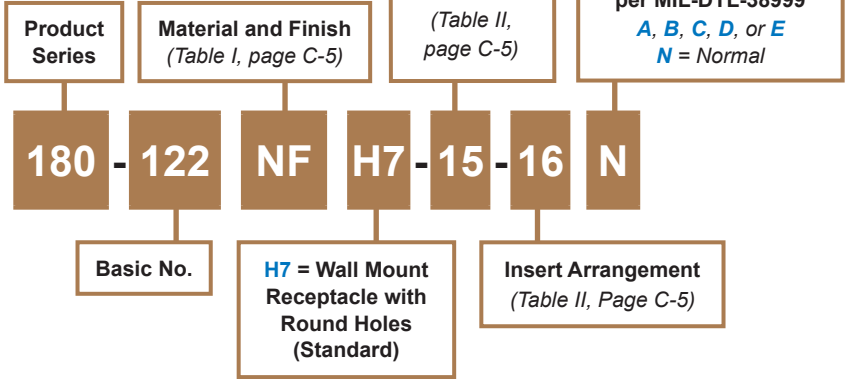
**180-122 (H7)**  
**GHD • Glenair High Density**  
**Fiber Optic Connection System**  
**D38999 Style Square Flange Receptacle with Round Holes**



**GHD Square flange receptacle with standard (round) holes**



**How To Order**



**H7 - Wall Mount Receptacle with Round Holes (Standard)**

**Material and Finish**

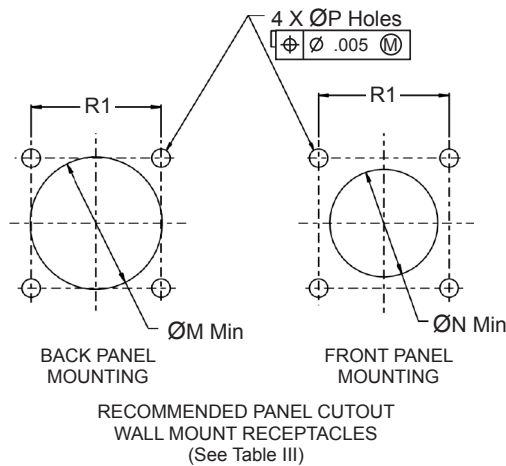
Shell: See Table I, Page C-5  
 Insert: High grade rigid dielectric, or Al Alloy/Anodized - MFR's option

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



**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)



**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)

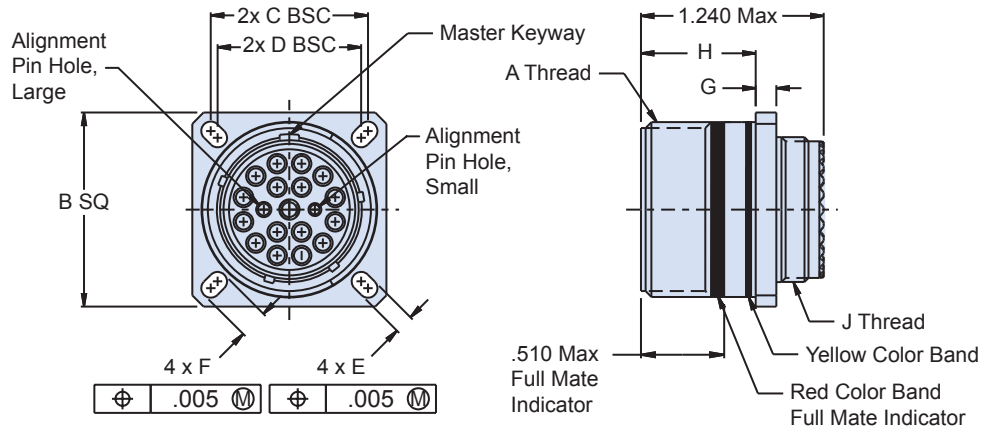
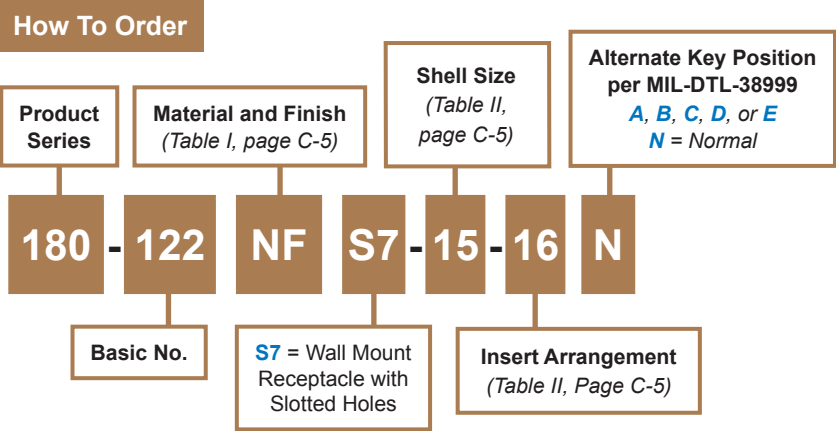


**180-122 (S7)**  
**GHD • Glenair High Density**  
**Fiber Optic Connection System**  
**D38999 Style Square Flange Receptacle with Slotted Holes**



C

**GHD Square flange receptacle with slotted holes**



**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.

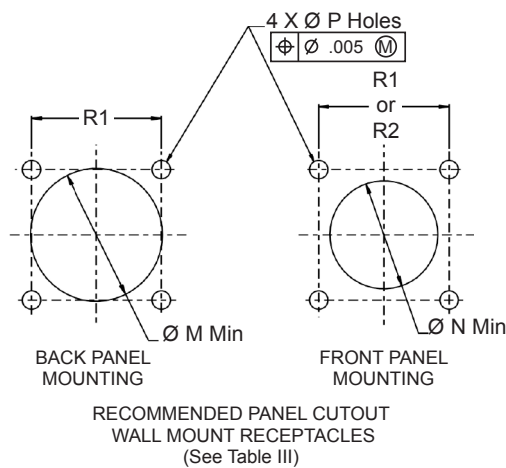


**180-122 (S7)**  
**GHD • Glenair High Density**  
**Fiber Optic Connection System**  
**D38999 Style Square Flange Receptacle with Slotted Holes**



**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



**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)



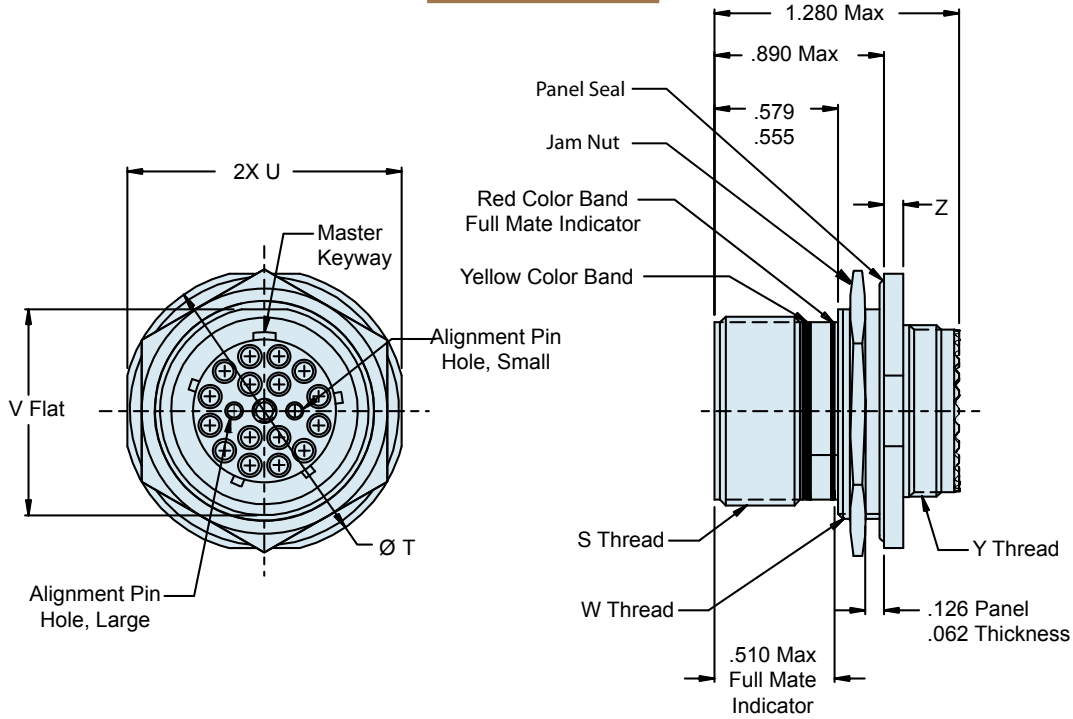
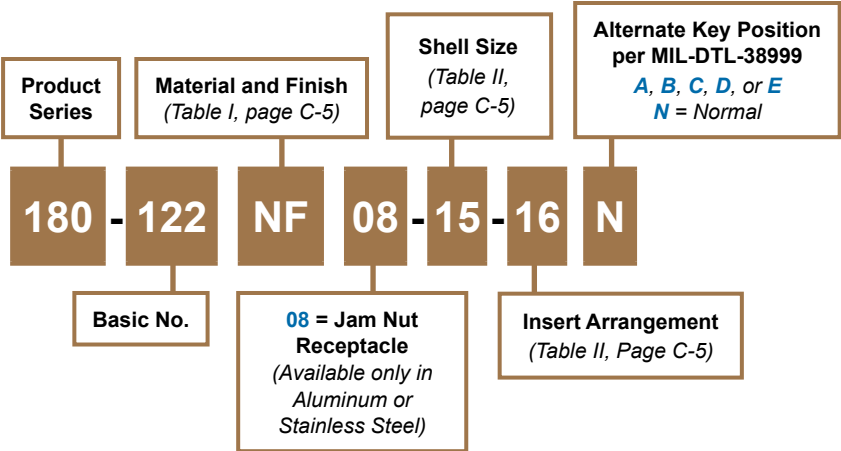
**180-122 (08)**  
**GHD • Glenair High Density**  
**Fiber Optic Connection System**  
**D38999 Style Jam Nut Mount Receptacle Connector**



**GHD Jam nut mount receptacle connector**

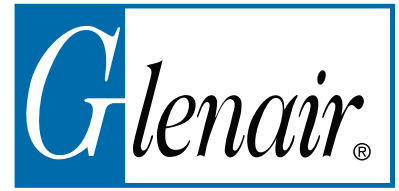
C

How To Order



**08 - JAM NUT MOUNT RECEPTACLE**

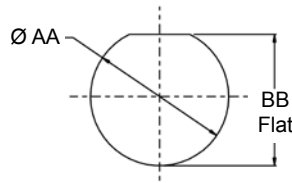
**180-122 (08)**  
**GHD • Glenair High Density**  
**Fiber Optic Connection System**  
**D38999 Style Jam Nut Mount Receptacle Connector**



**Table II: Shell Size**

Shell Size Code	Shell Size	S Thread	ØT	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.



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



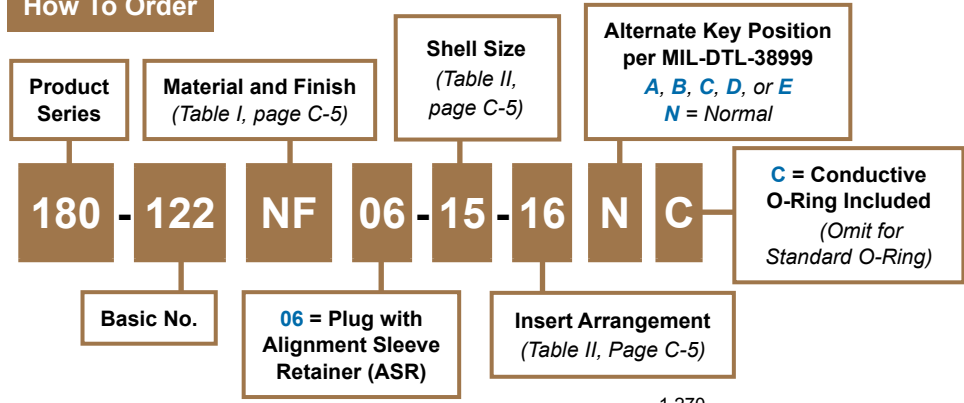
**GHD Plug connector with removable alignment sleeve retainer (ASR)**

C

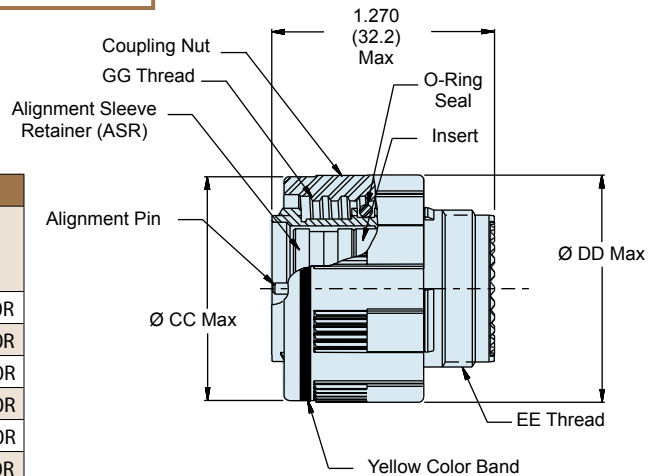


D38999 Style Plug Connector

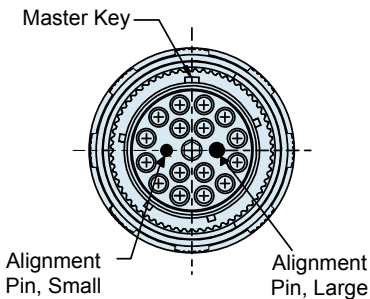
**How To Order**



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 (43.8)	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



**06 - PLUG WITH ASR**



**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 separately.  
 See Glenair drawing 180-122ASR.

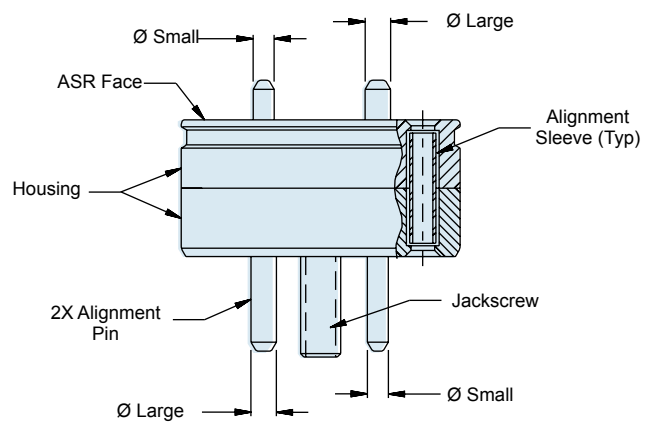
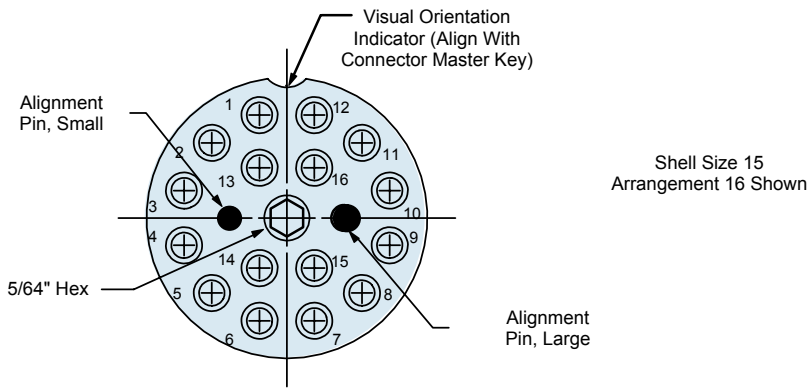
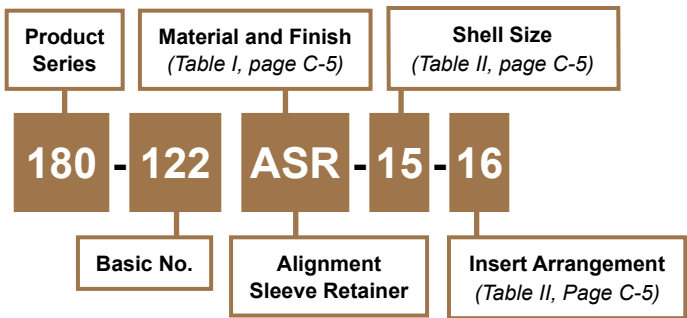


**GHD alignment sleeve retainer (ASR)**



Alignment Sleeve Retainer (ASR)

**How To Order**



**Material and Finish**

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



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.



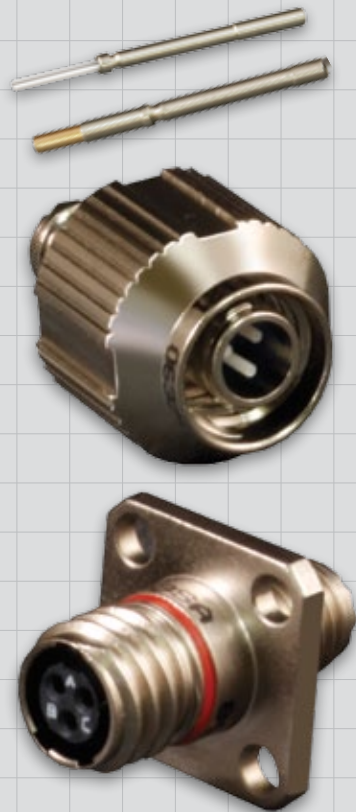


## Series 80 Mighty Mouse Fiber Optic General Information



### 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.
<b>Fiber Optic Termini</b>		
<b>181-063 • 181-064</b>	Series 80 Mighty Mouse Size #23 Fiber Optic Termini	D-2
<b>181-084 • 181-085</b>	Series 80 Mighty Mouse Size #20HD Fiber Optic Termini	D-4
<b>181-057 • 181-075</b>	Series 80 Mighty Mouse Size #16 Fiber Optic Termini	D-6
<b>Fiber Optic Connectors</b>		
<b>801-007 • 801-008</b>	Series 801 Mighty Mouse Plug Connectors	D-8
<b>801-009 • 801-010</b>	Series 801 Mighty Mouse Receptacle Connectors	D-10
<b>809-190 • 809-191</b>	Series 801 Mighty Mouse Protective Covers	D-14
<b>802-008 • 802-009</b>	Series 802 Mighty Mouse Plug Connectors	D-16
<b>802-010 • 802-011</b>	Series 802 Mighty Mouse Receptacle Connectors	D-18
<b>660-087 • 660-088</b>	Series 802 Mighty Mouse Protective Covers	D-22
<b>805-001 • 805-002</b>	Series 805 Mighty Mouse Plug Connectors	D-24
<b>805-003 • 805-004</b>	Series 805 Mighty Mouse Receptacle Connectors	D-26
<b>667-261 • 667-262</b>	Series 805 Mighty Mouse Protective Covers	D-30
<b>Mighty Mouse Backshell</b>		
<b>189M*052</b>	Convuluted 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°



## 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

D

### 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 separately), please refer to the insert arrangement tables for count and size.

Series 80 Insert Arrangements for use with #23 Fiber Optic termini							
<b>5-3</b>	<b>6-4</b>	<b>6-6</b>	<b>6-7</b>	<b>13-37</b>	<b>16-55</b>	<b>17-85</b>	<b>21-130</b>
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)

# Series 80 Mighty Mouse Contacts and Tools

## Size #23 Fiber Optic Termini 181-063 and 181-064



### Size #23 fiber optic termini



181-063 Pin Terminus

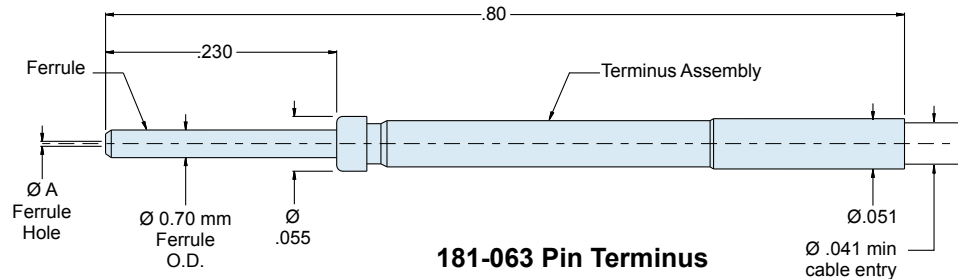


181-064 Socket Terminus

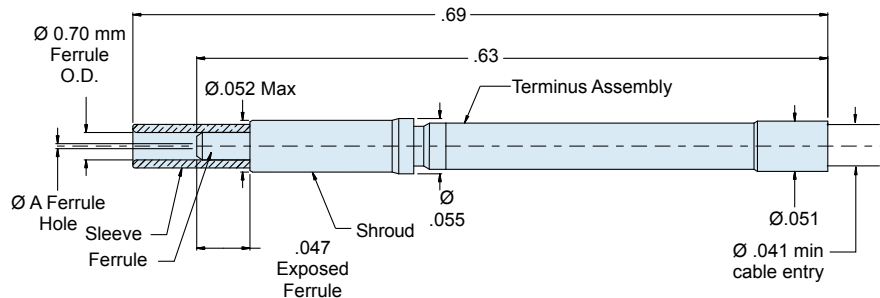
Size #23 fiber optic termini are compatible with all Series 80 Mighty Mouse threaded connectors with size #23 cavities. Typical insertion loss 0.5 dB. Fits 50/125 and 62.5/125 multi mode and 9/125 single mode fiber.

Termini Type	Optical Fiber Type	Part Number	ØA Ferrule Hole*	Fiber Size Core/Cladding
Pin	Single Mode	<a href="#">181-063-1255</a>	125.5 microns	9/125
	Multi Mode	<a href="#">181-063-126</a>	126.0 microns	50/125, 62.5/125
Socket	Single Mode	<a href="#">181-064-1255</a>	125.5 microns	9/125
	Multi Mode	<a href="#">181-064-126</a>	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

- Alignment sleeve is supplied with terminus assembly and may be ordered separately (see Table II).
- 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.



## 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

D

### 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 separately), 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)



# Series 80 Mighty Mouse Contacts and Tools

## Size #20HD Fiber Optic Termini 181-084 and 181-085



### Size #20HD fiber optic termini



181-084 Pin Terminus

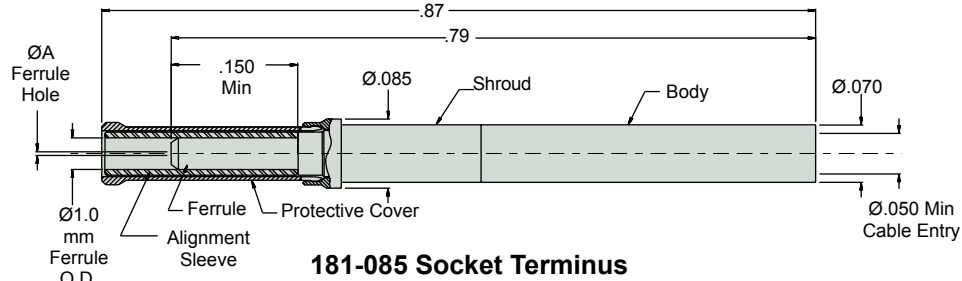
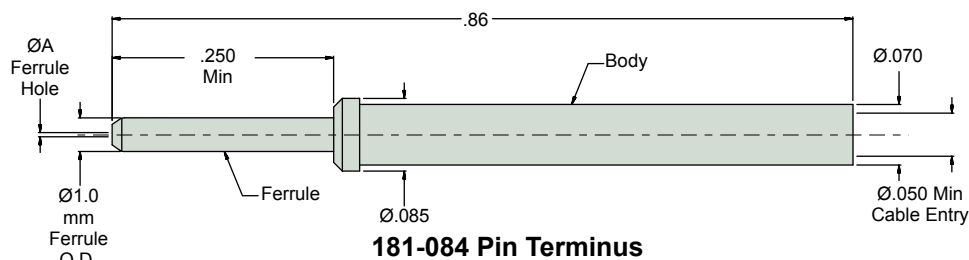


181-085 Socket Terminus

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	<a href="#">181-084-1255</a>	125.5 microns	9/125
	Multi Mode	<a href="#">181-084-126</a>	126.0 microns	50/125, 62.5/125
Socket	Single Mode	<a href="#">181-085-1255</a>	125.5 microns	9/125
	Multi Mode	<a href="#">181-085-126</a>	126.0 microns	50/125, 62.5/125

\*Consult factory for additional sizes



### 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

- Alignment sleeve and protective cover are supplied with socket terminus assembly, and may be ordered separately (see accessories table).
- 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.



## 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

D

### 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 separately), please refer to the insert arrangement tables for count and size.

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

<b>6-1</b> 1 ch.	<b>8-2</b> 2 ch.	<b>9-4</b> 4 ch.	<b>10-5</b> 5 ch.	<b>13-7</b> 7 ch.	<b>16-12</b> 12 ch.	<b>17-14</b> 14 ch.	<b>21-22</b> 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)



**Series 80 Mighty Mouse  
Contacts and Tools**  
Size #16 Fiber Optic Termini 181-057 and 181-075



**Size #16 fiber optic termini**

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.



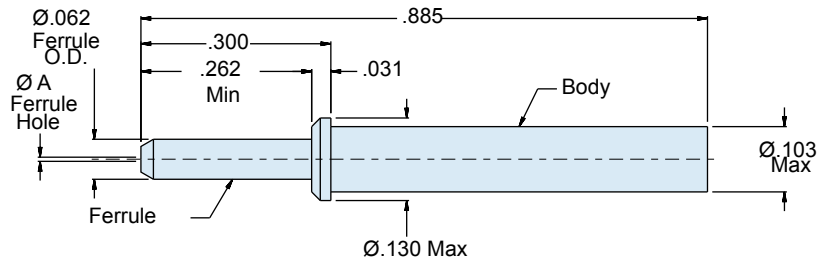
181-057 Pin Terminus



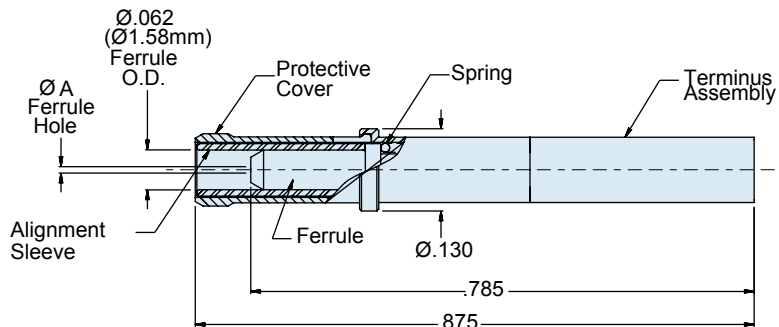
181-075 Socket Terminus

Termini Type	Optical Fiber Type	Part Number	A Ferrule I.D.
Pin	Single Mode	<b>181-057-125</b>	125.5 microns
	Multi Mode	<b>181-057-126</b>	126.0 microns
Socket	Single Mode	<b>181-075-125</b>	125.5 microns
	Multi Mode	<b>181-075-126</b>	126.0 microns

\*Consult factory for additional sizes



181-057 Pin Terminus



181-075 Socket 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.

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.



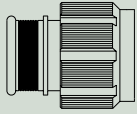
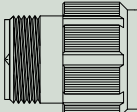
## Series 801 Mighty Mouse Double-Start ACME Threads Plug Connector Ordering Information 801-007 and 801-008



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.

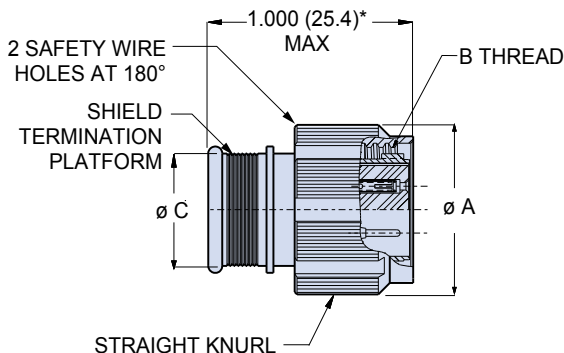
**D**

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
 <p><b>801-007</b> Banding Platform</p>  <p><b>801-008</b> Rear Accessory Thread</p>	<p style="color: blue;">-16</p> <p>Plug with Anti-Decoupling Spring</p> <p style="color: blue;">-26</p> <p>Self-Locking Plug with Ratchet Mechanism (the "Clicker")</p>	<p style="color: blue;">C</p> <p>Aluminum / Black Anodize (Non-Conductive) RoHS Compliant</p> <p style="color: blue;">M</p> <p>Aluminum / Electroless Nickel RoHS Compliant</p> <p style="color: blue;">NF</p> <p>Aluminum / Cadmium with Olive Drab Chromate</p> <p style="color: blue;">ZN</p> <p>Aluminum / Zinc-Nickel with Olive Drab Chromate</p> <p style="color: blue;">ZNU</p> <p>Aluminum / Zinc-Nickel with Black Chromate</p> <p style="color: blue;">MT</p> <p>Aluminum / Nickel-PTFE RoHS Compliant</p> <p style="color: blue;">Z1</p> <p>Stainless Steel / Passivated RoHS Compliant</p>	<p>SEE <b style="color: blue;">INSERT ARRANGEMENTS</b> PAGES D-2, D-4, D-6</p>	<p><i>Connector supplied without termini. Please indicate pin or socket.</i></p> <p style="color: blue;">A</p> <p>Pin connector, less termini</p> <p style="color: blue;">B</p> <p>Socket connector, less termini</p>	<p style="color: blue;">A</p> <p>Normal</p> <p>Alternate Key Positions:</p> <p style="color: blue;">B C D E F</p>

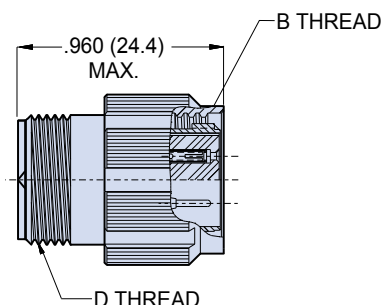
# Series 801 Mighty Mouse Double-Start ACME Threads Plug Connector Dimensions 801-007 and 801-008



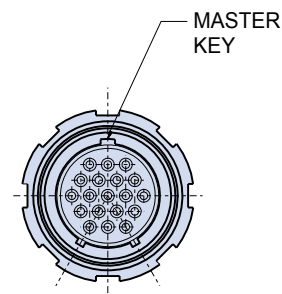
Mighty Mouse  
Fiber Optic



**Integral Band Platform**  
801-007



**Accessory Thread**  
801-008



**D**

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

Dimensions								
Shell Size	Style 16		Style 26		B Thread	Ø C		D Thread UNEF-2A
	Ø A		Ø A			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°



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



**In-Line**  
Shell Style 01

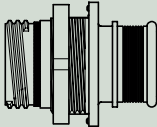
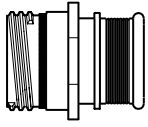
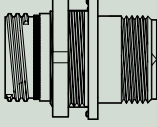
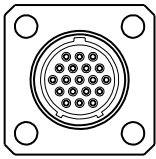
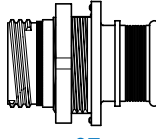


**Rear Panel Jam Nut Mount**  
Shell Style 07



**Square Flange Mount**  
Shell Style 02

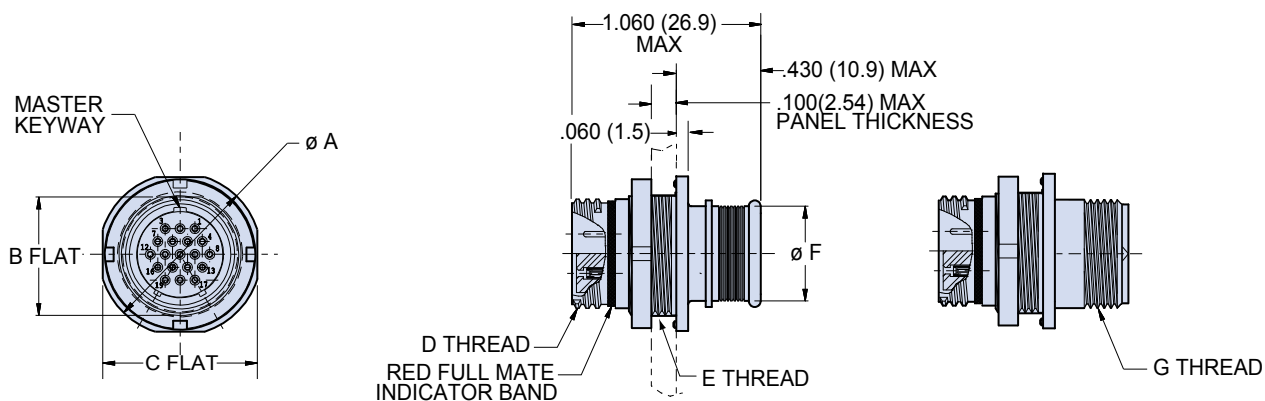
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How to Order					
Sample Part Number					
801-010	-02	Z1	16-55	B	A
Series	Shell Style	Shell Material / Finish	Shell Size- Insert Arrangement	Contact Type	Shell Key Position
 <b>801-009</b> Receptacle with Banding Platform	 <b>-01</b> In-Line For Free-Hanging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

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



Mighty Mouse  
Fiber Optic



Integral Band Platform  
801-009-07

Accessory Thread  
801-010-07

D

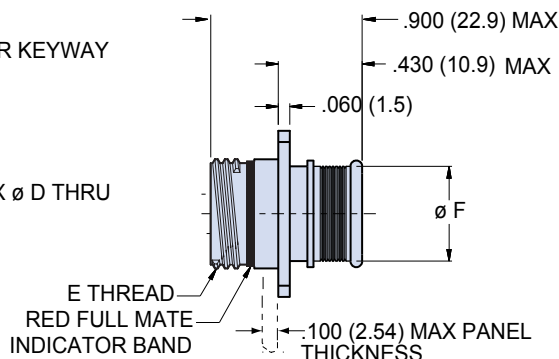
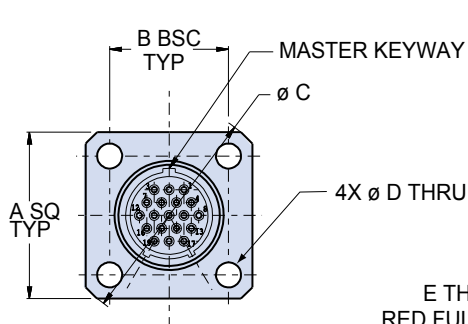
Dimensions											
Shell Size	Ø A		B Flat		C Flat		D Thread	E Thread UN-2A	Ø F		G Thread UN-2A
	In.	mm.	In.	mm.	In.	mm.			In.	mm.	
5	.575	14.61	.350	8.89	.545	13.84	.3125-.05P-.1L-2A	.375-28	.245	6.22	.250-32
6	.635	16.13	.410	10.41	.595	15.11	.375-.05P-.1L-2A	.4375-28	.290	7.37	.3125-32
7	.755	19.18	.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°

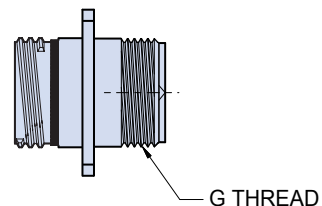
Series 801 Jam Nut Panel Cutout				
Shell Size	A Flat		Ø B	
	In. ± .002	mm. ± 0.05	In. ± .002	mm. ± 0.05
5	.356	9.04	.385	9.78
6	.416	10.57	.447	11.35
7	.542	13.77	.572	14.53
8	.542	13.77	.572	14.53
9	.602	15.29	.635	16.13
10	.666	16.92	.697	17.70
13	.851	21.62	.885	22.48
16	1.028	26.11	1.075	27.31
17	1.102	27.99	1.135	28.83
21	1.354	34.39	1.385	35.18



# 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

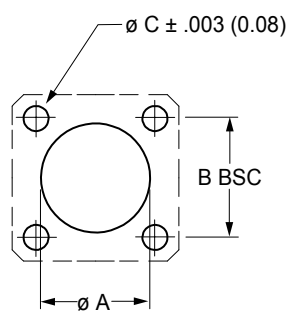


Accessory Thread  
801-010-02

D

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.		In.	mm.	
							+0.003	+0.08				
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
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



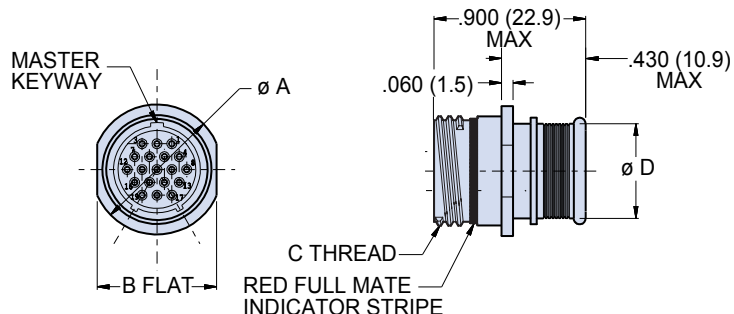
Key Positions		
	A°	B°
A	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°
E	75°	275°
F	95°	210°



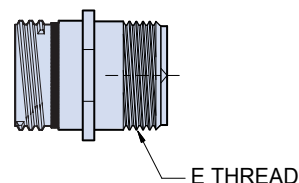
# Series 801 Mighty Mouse Double-Start ACME Threads In-Line Receptacle Connector Dimensions 801-009-01 and 801-010-01



Mighty Mouse  
Fiber Optic



Integral Band Platform  
801-009-01



Accessory Thread  
801-010-01

D

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°



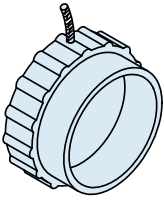
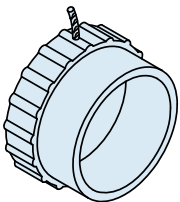

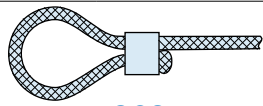

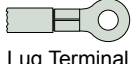
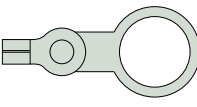
## Series 801 Mighty Mouse Double-Start ACME Threads Rubber Protective Cover Ordering Information 809-190 and 809-191



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. -40° to +120° 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

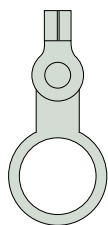
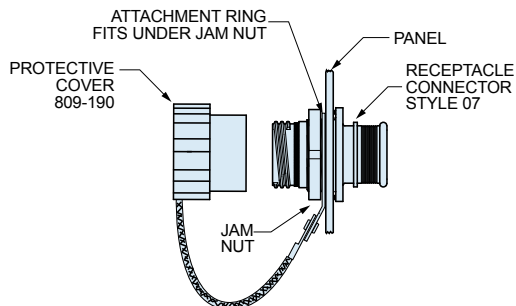
D

How to Order					
Sample Part Number					
809-191	- 05	G	6	- SCS	C
Series	Shell Size	Lanyard Type	Lanyard Length	Attachment Code	Conductive Rubber
 <p><b>809-190</b> Protective Cover for use with Series 801 Receptacles</p>  <p><b>809-191</b> Protective Cover for use with Series 801 Plugs</p>	<p>-05 -06 -07 -08 -09 -10 -13 -16 -17</p>	<p><b>-G</b> Nylon Rope  (Omit for no lanyard)</p>	<p>Length in Inches</p>	 <p><b>-WS</b> Nylon Cable Tie, 1.77 Inch (45mm) Maximum Wire Bundle Diameter</p>	<p>Omit for Standard Neoprene  <b>C</b> Conductive Rubber</p>
				 <p><b>-SCS</b> Adjustable Slip Knot with Crimp Sleeve. The sleeve can be crimped with pliers for a permanent attachment.</p>	
				 <p><b>-00</b> Lanyard With No Attachment (Fused End)</p>	
				Lug Terminals and Rings	
 <p>Lug Terminal</p>	<p><b>-01</b> – .126 (3.20) I.D. <b>-02</b> – .145 (3.68) I.D. <b>-06</b> – .188 (4.78) I.D. <b>-07</b> – .197 (5.00) I.D.</p>				
 <p>Solid Ring</p>	<p><b>-08</b> – .385 (9.78) I.D. <b>-09</b> – .445 (11.30) I.D. <b>-10</b> – .516 (13.11) I.D. <b>-11</b> – .570 (14.48) I.D. <b>-12</b> – .583 (14.81) I.D. <b>-13</b> – .635 (16.13) I.D. <b>-14</b> – .695 (17.65) I.D. <b>-15</b> – .776 (19.71) I.D. <b>-16</b> – .885 (22.48) I.D. <b>-17</b> – .896 (25.76) I.D. <b>-18</b> – 1.015 (25.78) I.D. <b>-19</b> – 1.070 (27.18) I.D. <b>-20</b> – 1.135 (28.83) I.D. <b>-21</b> – 1.141 (28.98) I.D.</p>				

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



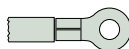
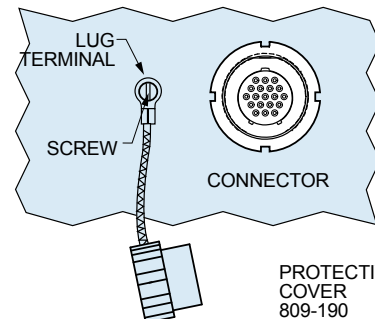
## Attaching a 809-190 Receptacle Cover to a Rear Panel Mounted Jam Nut Receptacle



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

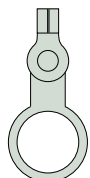
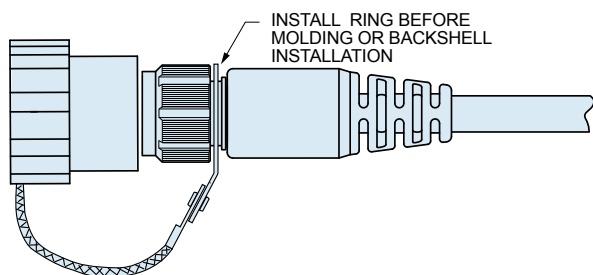
## Attaching a Cover to a Panel With a Screw



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

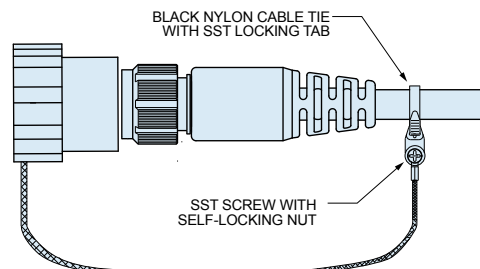
## Attaching a Cover to a Cable Assembly With a Solid Ring



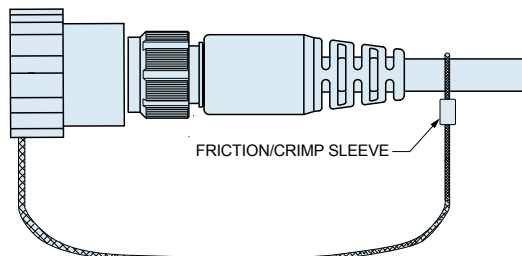
Large Ring

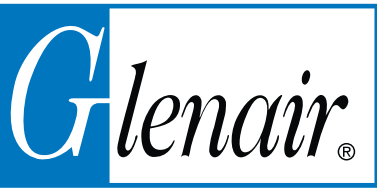
Dia. Code	Shell Size	Ring I.D.		Ring O.D.	
		In.	mm.	In.	mm.
		± .010	±0.25	± .015	± 0.38
08	5,6	.385	9.78	.510	12.95
09	7	.445	11.30	.565	14.35
11	8, 9	.570	14.48	.685	17.40
14	10, 13	.695	17.65	.820	20.82
19	16, 17	1.070	27.17	1.195	30.35

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



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





## Series 802 "Aqua Mouse" Submersible Plug Connector Ordering Information

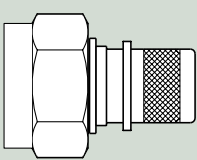
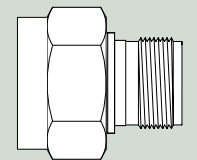
802-008 and 802-009



Series 802 Plug

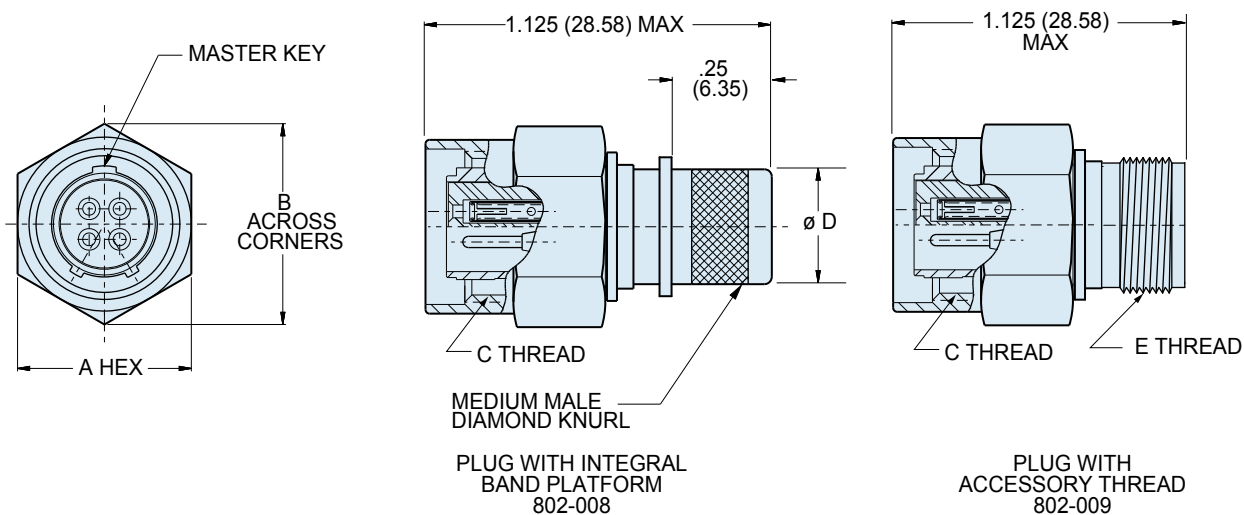
Glenair's Series 802 Mighty Mouse connectors feature stainless steel or marine bronze shells with marine bronze coupling nuts to withstand corrosion in the most hostile environments, and are designed to accommodate (depending on insert arrangement) Glenair size #16, #20HD, or #23 fiber optic termini (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
 <p style="text-align: center;"><b>802-008</b> Plug with Banding/ Molding Platform</p>  <p style="text-align: center;"><b>802-009</b> Plug with Accessory Thread</p>	<p style="text-align: center;"><b>-06</b> Plug</p>	<p style="text-align: center;"><b>Z1</b> Stainless Steel Shell / Passivated, with Marine Bronze Coupling Nut</p> <p style="text-align: center;"><b>ZM</b> Stainless Steel Shell / Electroless Nickel Plated, with Marine Bronze Coupling Nut</p> <p style="text-align: center;"><b>AB</b> Marine Bronze Shell and Coupling Nut / Unplated</p>	<p style="text-align: center;">SEE <b>INSERT ARRANGEMENTS</b> PAGES D-2, D-4, D-6</p>	<p style="text-align: center;"><i>Connector supplied without termini. Please indicate pin or socket.</i></p> <p style="text-align: center;"><b>A</b> Pin connector, less termini</p> <p style="text-align: center;"><b>B</b> Socket connector, less termini</p>	<p style="text-align: center;"><b>A</b> Normal</p> <p style="text-align: center;"><b>B</b> Pos. B</p> <p style="text-align: center;"><b>C</b> Pos. C</p> <p style="text-align: center;"><b>D</b> Pos. D</p>

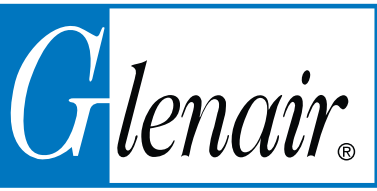
# Series 802 "Aqua Mouse" Submersible Plug Connector Dimensions

## 802-008-06 and 802-009-06



Dimensions								
Shell Size	A Hex		B Max.		C Mating Threads	Ø D		E Threads Accessory
	In.	mm.	In.	mm.		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°



# Series 802 "Aqua Mouse" Submersible Receptacle Ordering Information

802-010 and 802-011



Jam Nut, Rear Mount

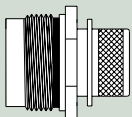
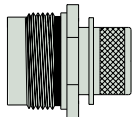
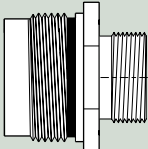
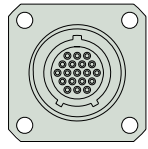
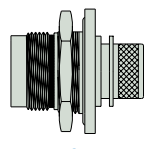


Square Flange

**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.

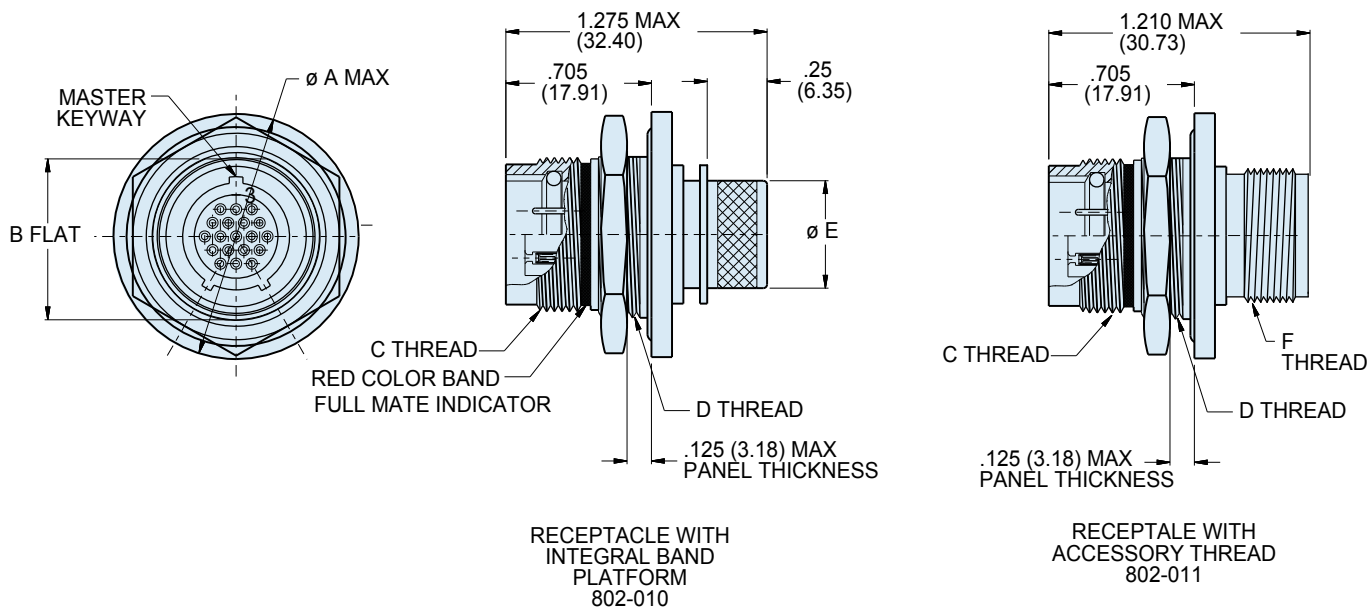
**Two Shell Styles:** Choose the integral band platform for direct attachment of a cable shield. Install a boot, or overmold a boot over the band platform. An accessory thread is available for attaching strain reliefs and backshells.

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		
 <b>802-010</b> Receptacle with Banding Platform	 <b>-01</b> In-Line	<b>Z1</b> Stainless Steel / Passivated	SEE <b>INSERT ARRANGEMENTS</b> PAGES D-2, D-4, D-6	<b>Connector supplied without termini. Please indicate pin or socket.</b>	<b>A</b> Normal		
 <b>802-011</b> Receptacle with Accessory Thread	 <b>-02</b> Square Flange	<b>ZM</b> Stainless Steel / Electroless Nickel Plated				<b>A</b> Pin connector, less termini	<b>B</b> Pos. B
	 <b>-07</b> Jam Nut for Rear Panel Mounting	<b>AB</b> Marine Bronze / Unplated				<b>B</b> Socket connector, less termini	<b>C</b> Pos. C
					<b>D</b> Pos. D		

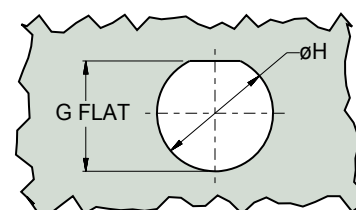


# Series 802 "Aqua Mouse" Submersible Jam Nut Receptacle Connector Dimensions 802-010-07 and 802-011-07



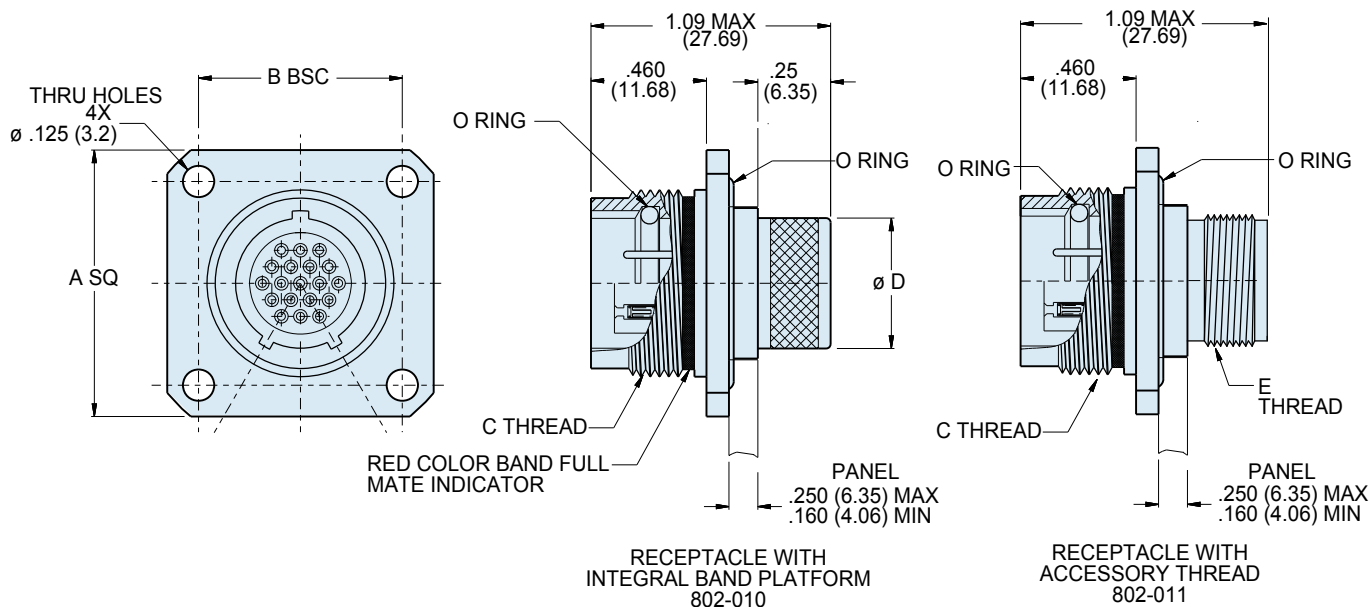
Dimensions													
Shell Size	A Max.		B Flat		C Mating Threads	D Jam Nut Threads	Ø E		F Accessory Threads	G Flat		Ø H	
	In.	mm.	In. ±.003	mm. ±0.08			In.	mm.		In. ±.003	mm. ±0.08	In.	mm.
5	.885	22.48	.466	11.84	.438-28 UNEF	.500-32 UN-2A	.232	5.90	.2500-32 UNEF-2A	.477	12.12	.510	12.95
6	1.010	25.65	.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°

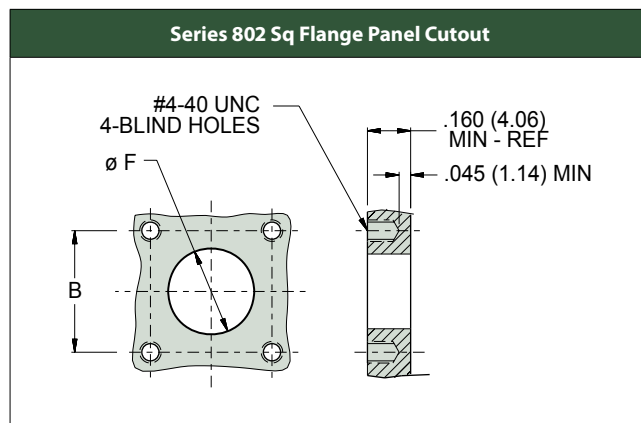
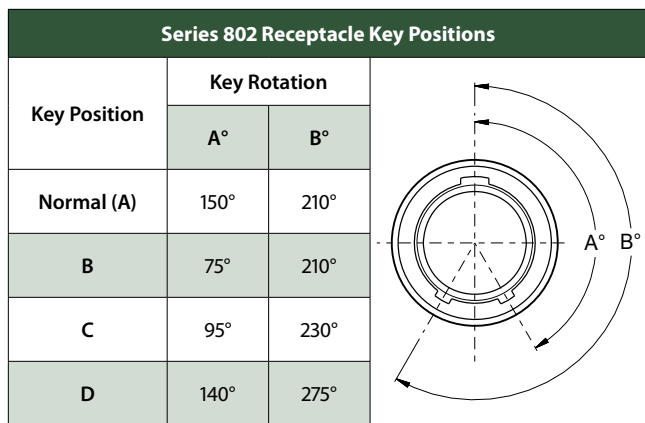


RECOMMENDED PANEL CUTOUT

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

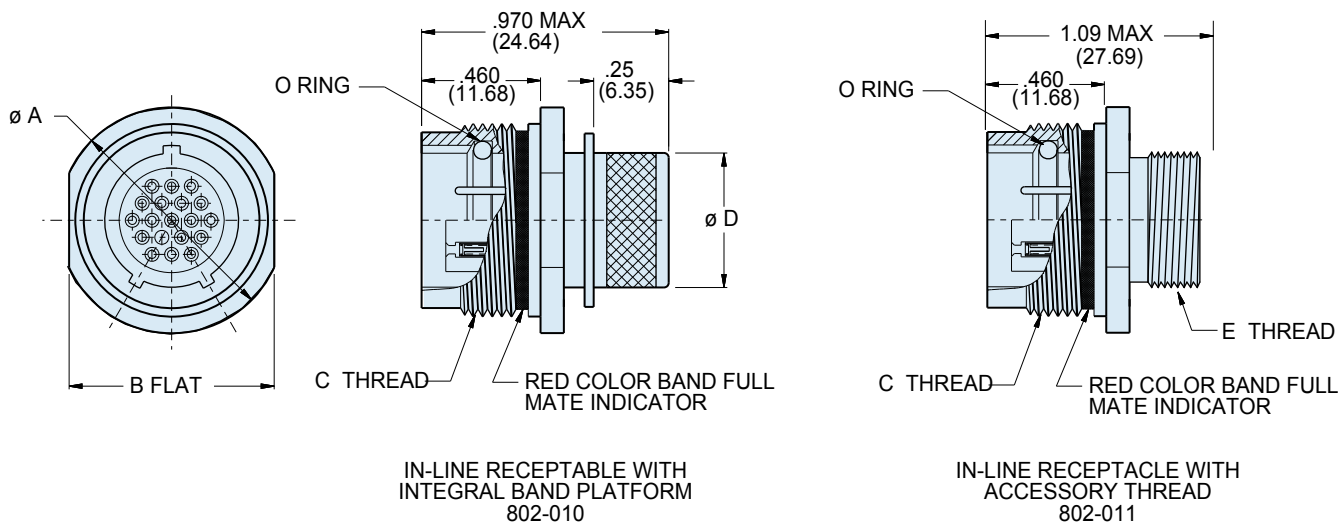


Dimensions										
Shell Size	A Square		B Bsc.		C Mating Threads	Ø D		E Accessory Threads	Ø F	
	In.	mm.	In.	mm.		In.	mm.		In.	mm.
5	.885	22.48	.500	12.70	.438-28 UNEF	.232	5.90	.2500-32 UNEF-2A	.327	8.31
6	1.010	25.65	.625	15.88	.562-20 UN	.312	7.92	.3125-32 UNEF-2A	.390	9.91
7	1.072	27.23	.688	17.48	.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 "Aqua Mouse" Submersible In-Line Receptacle Connector Dimensions

## 802-010-01 and 802-011-01



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°



## Series 802 "Aqua Mouse" Submersible Protective Cover Ordering Information

660-087 and 660-088



Receptacle Cover

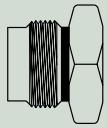
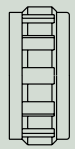

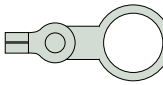
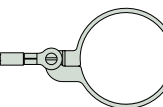
**Protect Connectors From Damage** – These covers prevent ingress of water and contamination. Stainless steel plug covers feature Viton® O-rings for 3500 PSI sealing. Receptacle covers have a Viton® gasket and are made from marine bronze to minimize galling.

**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

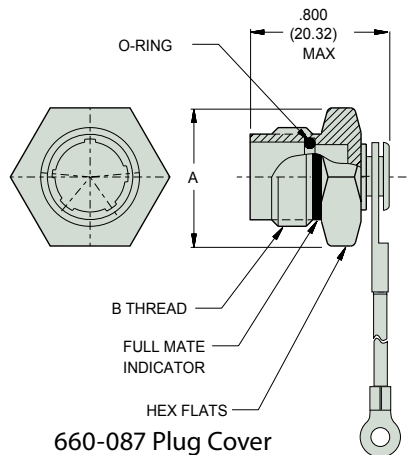
How to Order Series 802 Protective Covers							
Sample Part Number							
660-087	- 9	U	04		- 6		
Series	Shell Size	Attachment Type	Attachment Code		Attachment Length in Inches		
 <b>660-087</b> Protective Cover for use with Series 802 Plugs   <b>660-088</b> Protective Cover for use with Series 802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

# Series 802 "Aqua Mouse" Submersible Protective Cover Dimensions

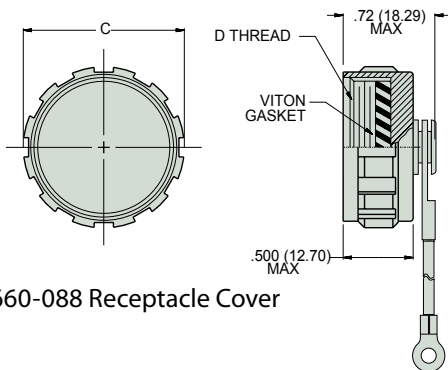
660-087 and 660-088



Mighty Mouse  
Fiber Optic



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								
<p>Small Ring for Attaching Receptacle Covers to a Panel with a Screw</p>	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			
<p>Large Solid Ring for Attaching Receptacle Covers to a Jam Nut Receptacle</p>	Dia. Code	Style 07 Jam Nut Shell Size	Style 00 Jam Nut Shell Size	Ring I.D.		Ring O.D.		
		In.	mm.	In.	mm.	In.	mm.	
					±.005	±0.13	Max.	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	
<p>Large Split Ring for Attaching Covers to Cables</p>	Dia. Code	Max. Cable Dia.		Min. ID		Max. OD		
		In.	mm.	In.	mm.	In.	mm.	
	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	
<p>Slip Knot (SK) for Attaching Covers to Cable</p>	-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	
<p>Nylon Rope</p>	-55° to +100°C., black, very flexible, very good abrasion resistance, good resistance to fuels, .120" (3mm) diameter
<p>Polyurethane Coated Wire Rope</p>	Black polyurethane over stainless steel rope, -55° to +125°C., very flexible, excellent abrasion resistance, excellent resistance to fuels, .080" (2mm) diameter
<p>Teflon Jacketed Wire Rope</p>	Translucent FEP jacket over stainless steel rope, -55° to +200°C., fair flexibility, good abrasion resistance, .100" diameter
<p>Sash Chain</p>	Stainless steel, #8 chain, .240" (6mm)

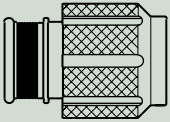
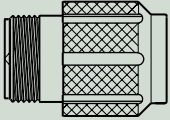


## Series 805 Mighty Mouse Triple-Start Plug Connector Ordering Information 805-001 and 805-002



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 feature 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.

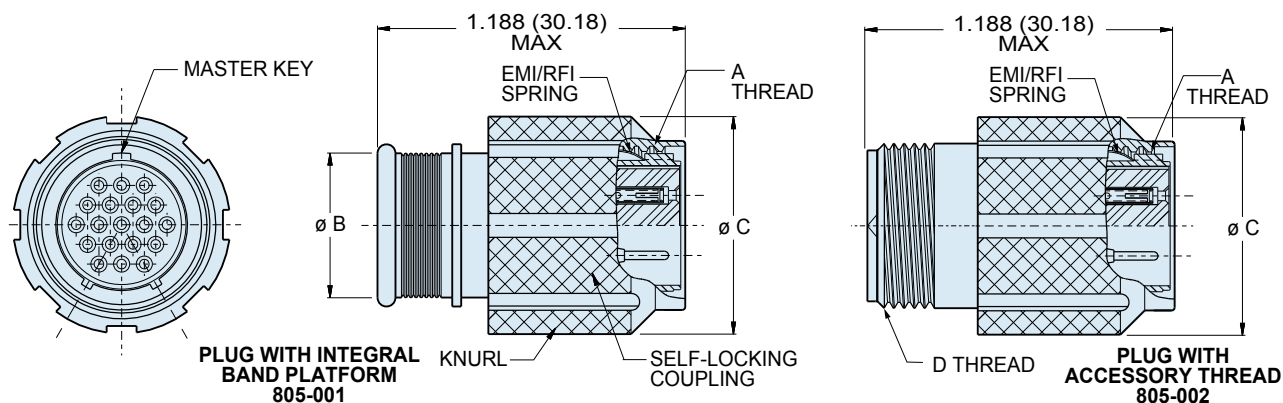
D

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



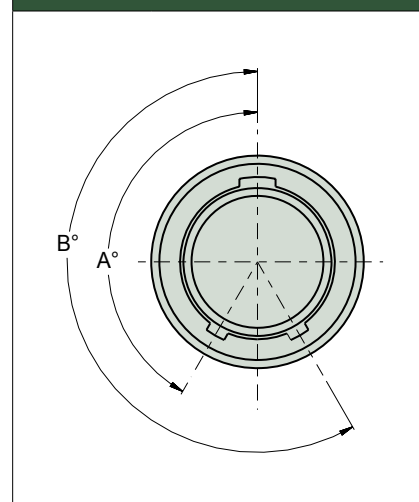
# Series 805 Mighty Mouse Triple-Start Plug Connector Dimensions

## 805-001-16 and 805-002-16



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

### Series 805 Key Positions

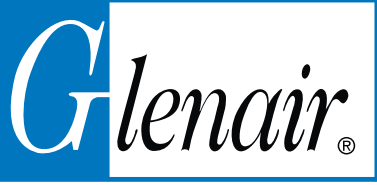


Performance Specifications	
DWV	#23 500 VAC Sea Level, #20HD 750 VAC, #12 AND #16 1800 VAC
Insulation Resistance	5000 Megohms Minimum
Operating Temperature	-55° C. to +150° C.
Immersion, Mated	MIL-STD-810 Method 512. One Meter for One Hour.
EMI	65 dB Minimum from 1 GHz. to 10 GHz.

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

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



Series 805 Triple-Start  
Jam Nut Connector

**Three Shell Mounting Options**

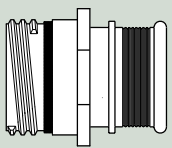
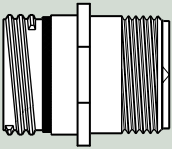
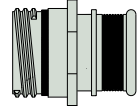
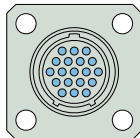
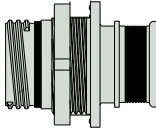
Jam nut with O-ring for rear panel mounting, square flange for front or rear panel mounting, or in-line receptacles for free-hanging cables.

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

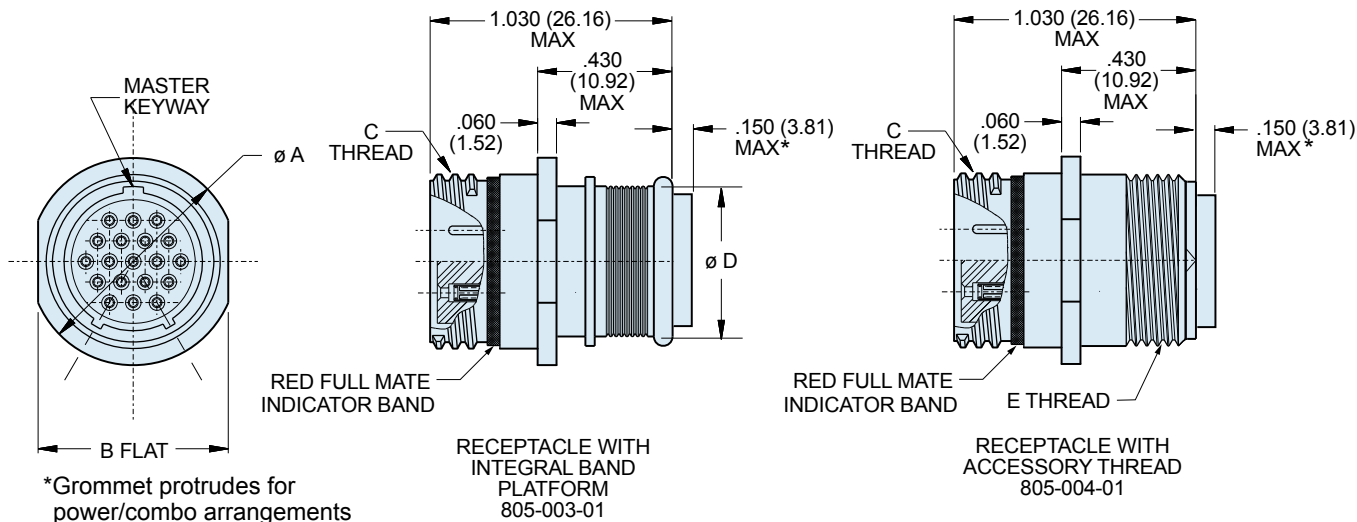
**Two Shell Styles:** Choose **integral band platform** for direct attachment of a cable shield. Install a boot, or overmold a boot

over the band platform. An **accessory thread** is available for attaching strain reliefs and backshells.

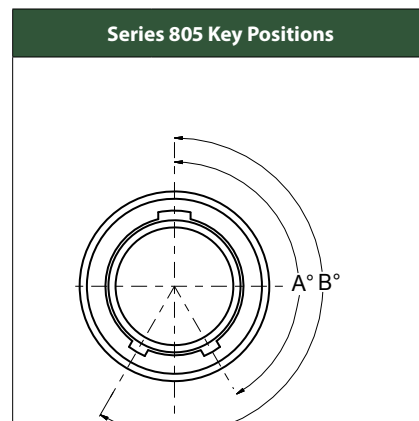
**D**

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
 <b>805-003</b> Receptacle with Banding Platform   <b>805-004</b> Receptacle with Accessory Thread	 <b>-01</b> In-Line   <b>-02</b> Square Flange   <b>-07</b> Jam Nut for Rear Panel Mounting	<p style="text-align: center;"><b>C</b> Aluminum / Black Anodize (Non-Conductive) RoHS Compliant</p> <p style="text-align: center;"><b>M</b> Aluminum / Electroless Nickel RoHS Compliant</p> <p style="text-align: center;"><b>NF</b> Aluminum / Cadmium with Olive Drab Chromate</p> <p style="text-align: center;"><b>ZN</b> Aluminum / Zinc-Nickel with Olive Drab Chromate</p> <p style="text-align: center;"><b>ZNU</b> Aluminum / Zinc-Nickel with Black Chromate</p> <p style="text-align: center;"><b>MT</b> Aluminum / Nickel-PTFE RoHS Compliant</p> <p style="text-align: center;"><b>Z1</b> Stainless Steel / Passivated RoHS Compliant</p>	SEE <b>INSERT ARRANGEMENTS</b> PAGES D-2, D-4, D-6	<p style="text-align: center;"><b>A</b> Connector supplied without termini. Please indicate pin or socket.</p> <p style="text-align: center;"><b>A</b> Pin connector, less termini</p> <p style="text-align: center;"><b>B</b> Socket connector, less termini</p>	<p style="text-align: center;"><b>A</b> Position A (Normal)</p> <p style="text-align: center;"><b>B</b> Position B</p> <p style="text-align: center;"><b>C</b> Position C</p> <p style="text-align: center;"><b>D</b> Position D</p>

# 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



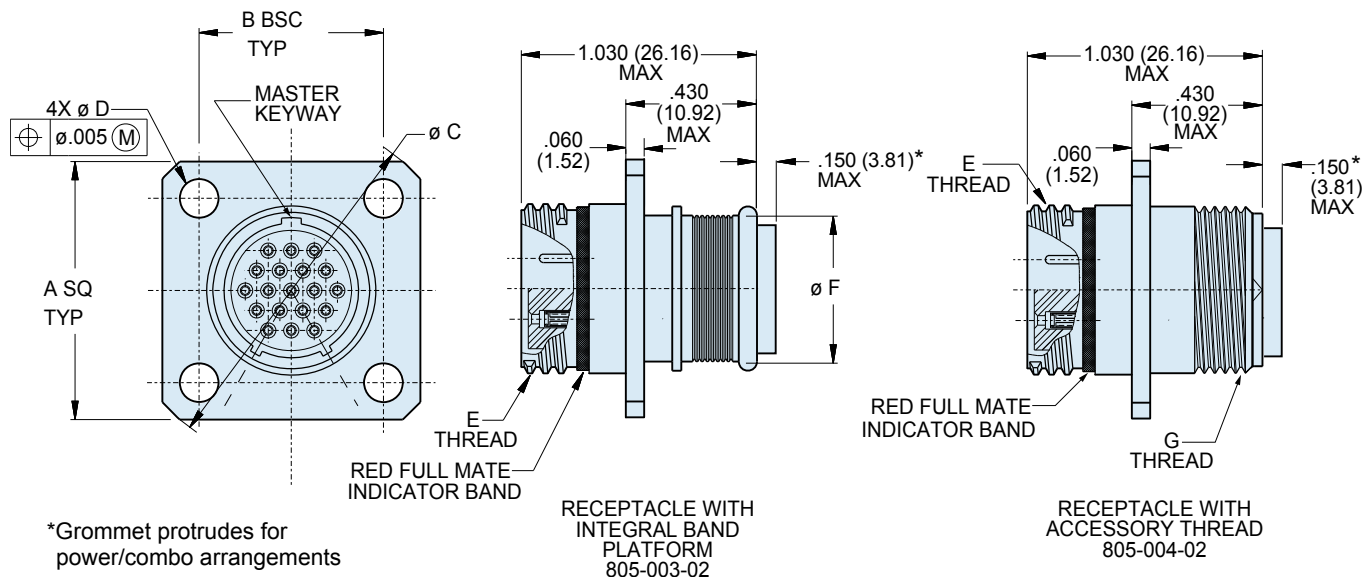
Performance Specifications	
DWV	#23 500 VAC Sea level, #20HD 750 VAC, #12 AND #16 1800 VAC
Insulation Resistance	5000 Megohms Minimum
Operating Temperature	-55° C. to +150° C.
Immersion, Mated	MIL-STD-810 Method 512. One Meter for One Hour.
EMI	65 dB Minimum from 1 GHz. to 10 GHz.

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

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 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.	mm.	In.	mm.	In.	mm.	In.	mm.		In.	mm.	
							± .003	± .08				
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

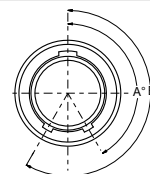
### Performance Specifications

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

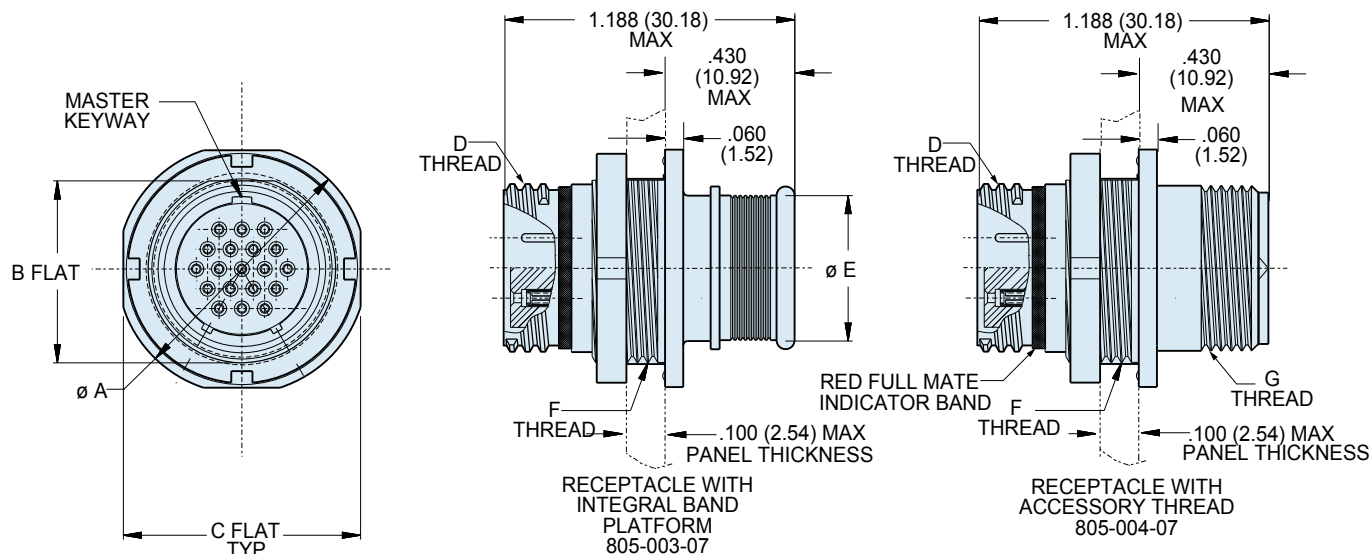


Key Position	Key Rotation	
	A	B
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°

# Series 805 Mighty Mouse Triple-Start Jam Nut Receptacle Dimensions 805-003-07 and 805-004-07



Mighty Mouse  
Fiber Optic



D

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°



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

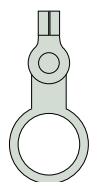
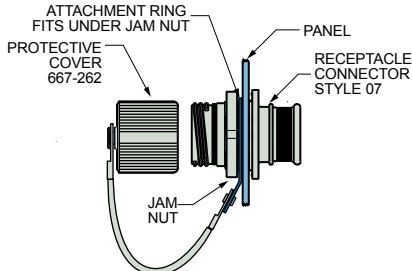


# Series 805 Mighty Mouse Triple-Start Protective Cover Dimensions

## 667-262



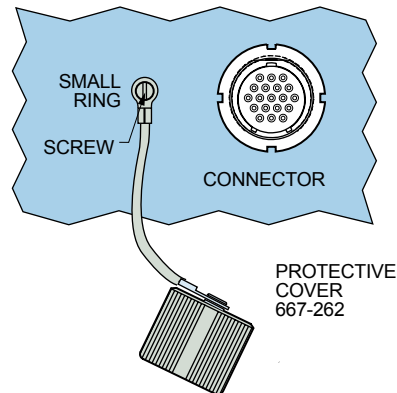
### Attaching a 667-262 Receptacle Cover to a Rear Panel Mounted Jam Nut Receptacle



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

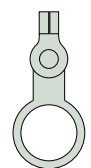
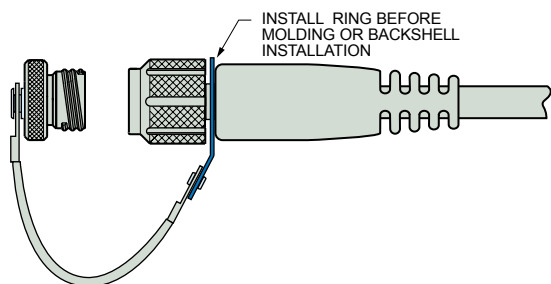
### Attaching a 667-262 Receptacle Cover to a Panel With a Screw



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

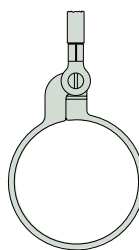
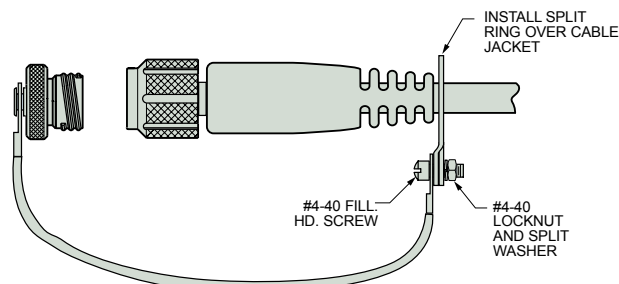
### Attaching a Cover to a Cable Assembly With a Solid Ring



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

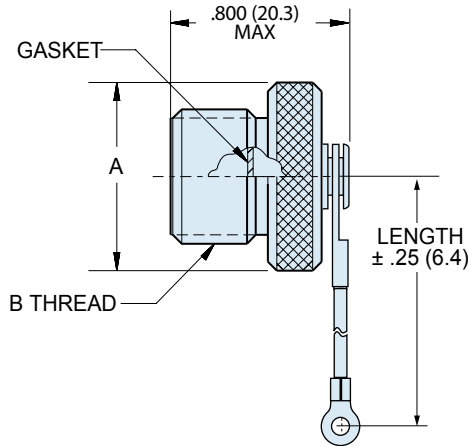


Large Split Ring for Attaching Covers to Cables

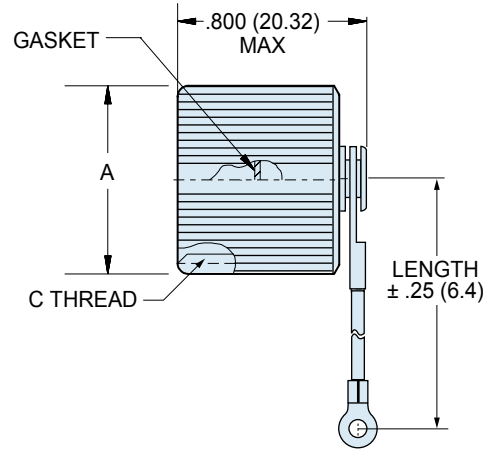
Dia. Code	Max. Cable Dia. (in.)	Ring Diameter			
		Min. ID		Max. OD	
		In.	mm.	In.	mm.
50	.410	.420	10.67	.580	14.73
52	.470	.480	12.19	.640	16.26
54	.625	.635	16.13	.796	20.22
56	.735	.745	18.92	.905	22.99
58	.875	.885	22.48	1.046	26.57
60	1.000	1.010	25.65	1.171	29.74
64	1.115	1.125	28.58	1.285	32.64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



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



667-261 Plug Cover



667-262 Receptacle Cover

D

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

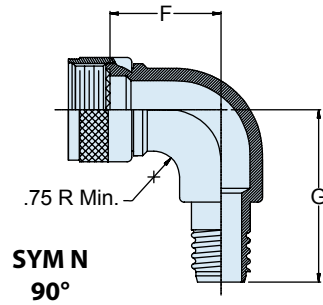
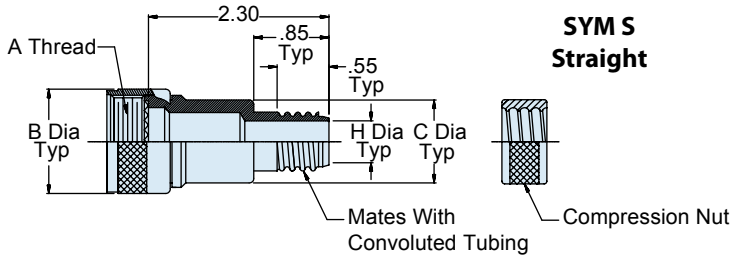
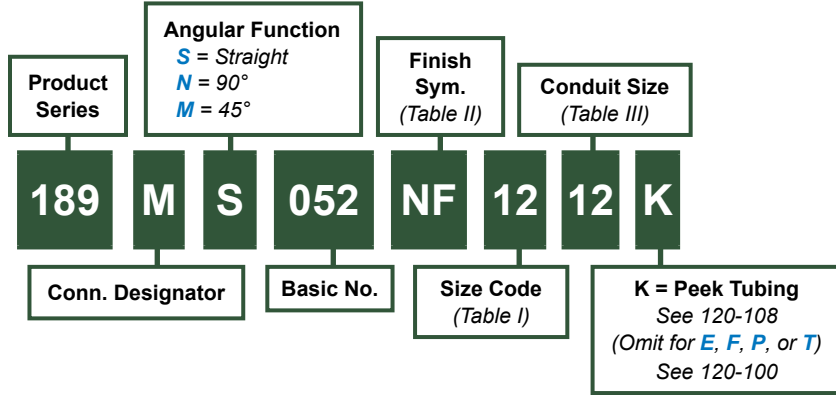
Lanyard options	
<b>Nylon Rope</b>	-55° to +100°C., black, very flexible, very good abrasion resistance, good resistance to fuels, .120" (3mm) diameter
<b>Polyurethane Coated Wire Rope</b>	Black polyurethane over stainless steel rope, -55° to +125°C., very flexible, excellent abrasion resistance, excellent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

**189 M\* 052**  
**Convolution Tubing Backshell**  
 for Series 80 "Mighty Mouse" Fiber Optic Connectors

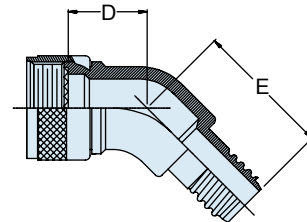


**Series 80 Convolution Tubing Backshell**

**How to Order**



**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

FIBER OPTIC

# GLENAIR EYE-BEAM

FIBER OPTIC CONNECTION SYSTEM



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 terminus bodies to ensure perfect alignment of optical signals and optimal optical performance. Best of all, the Eye-Beam™ can be integrated into virtually any circular or rectangular connector package.

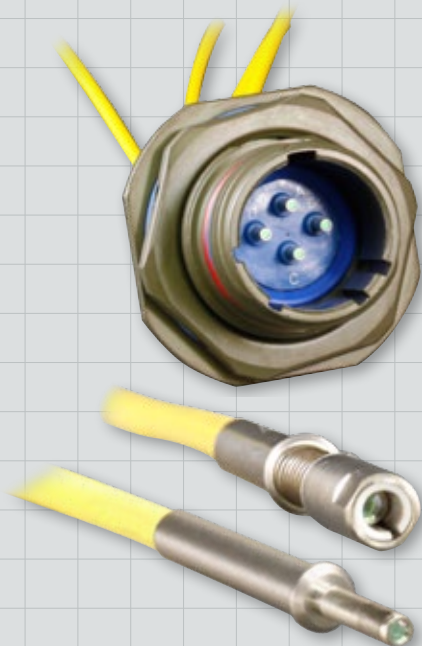


# Glenair Eye-Beam™ Expanded Beam Fiber Optic Connection System General Information



## The revolutionary new expanded beam fiber optic connection system from Glenair

Eye-Beam™ 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.
<b>Glenair Eye-Beam™ Expanded Beam Fiber Optic System</b>		
	Glenair Eye-Beam™ Fiber Optic System Overview	E-2
<b>FA1000</b>	Glenair Eye-Beam™ Fiber Optic Jumpers	E-3

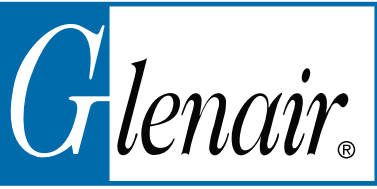


### Catalog Notes

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°





## Glenair Eye-Beam™ Expanded Beam Fiber Optic Connection System

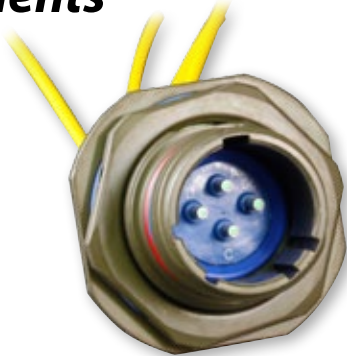


Eye-Beam™ Expanded Beam fiber optic terminus integrated into ruggedized reverse-bayonet power connectors

**Innovative expanded beam terminus deliver optimal performance in harsh environments**

- All the benefits of an expanded beam connection system built into a versatile F/O terminus
- Factory-terminated F/O Eye-Beam™ terminus 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

E



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

Comparison of standard butt-joint fiber optic terminus to Eye-Beam™ 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™ Expanded Beam Fiber Optic Terminus



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

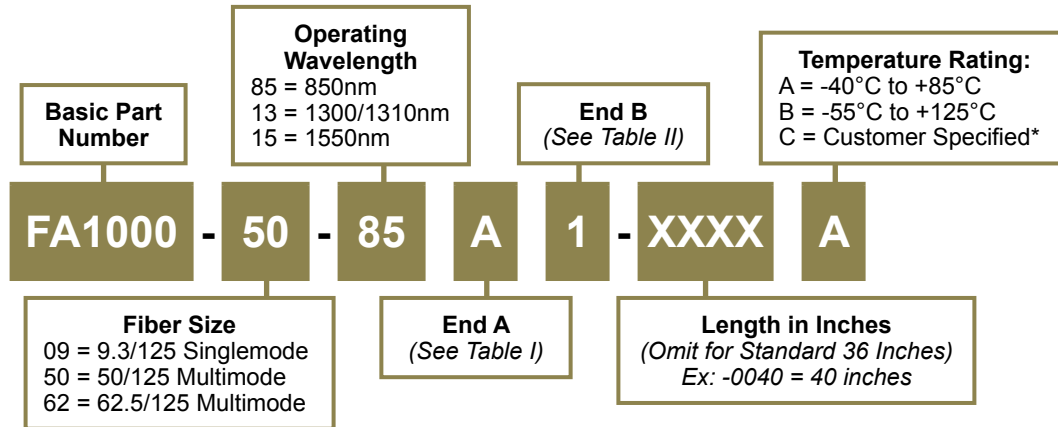


# Glenair Eye-Beam™ Expanded Beam Fiber Optic Connection System



## How To Order factory terminated Eye-Beam™ jumpers

1. Eye-Beam™ 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.

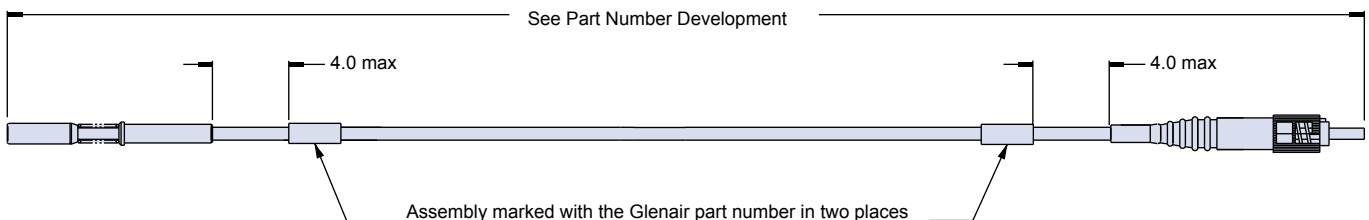


Designator	Description	Connector Series
A	M29504/04 Style Pin (181-070)	MIL-DTL-38999 Series III
	Mighty Mouse Size 16 Pin (181-070)	Series 80 Mighty Mouse
B	M29504/05 Style Socket, Springless (181-077)	MIL-DTL-38999 Series III
C	M29504/14 Style Pin (181-095)	MIL-PRF-28876
D	M29504/15 Style Socket (181-096)	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)

A	M29504/04 Style Pin (181-070)
	Mighty Mouse Size 16 Pin (181-070)
B	M29504/05 Style Socket, Springless (181-077)
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*

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



**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.



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

#### **1000BASE-T to 1000BASE-SX/LX Media Converter**

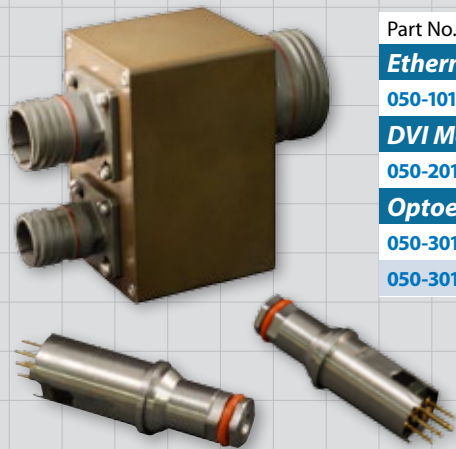
The Glenair Gigabit fiber optic/electric media converter converts 1000BASE-T data from twisted pair copper cable to 1000BASE-SX/LX serial data transmitted over a pair of optical fibers. The purpose of the device is to allow both longer distance and more reliable communication in ruggedized military and 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.
<b>Ethernet Media Converter</b>		
<b>050-101</b>	1000Base-T to 1000Base-SX/LX Media Converter	F-2
<b>DVI Media Converter</b>		
<b>050-201</b>	DVI Copper to Fiber Media Converter	F-6
<b>Optoelectronic Inserts</b>		
<b>050-301</b>	Size #8 Cavity Optoelectronic Insert Transmitter	F-10
<b>050-301</b>	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°

### 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.



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



**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	$\lambda_{out}$	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	$\lambda_{in}$	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	275 Meters
Gigabit Ethernet, 1000BASE-LX, 1310nm FP	50/125µm, 500MHZ*Km	550 Meters
	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

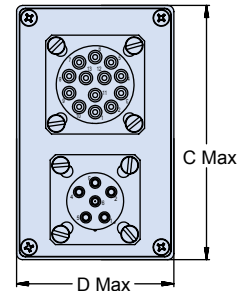
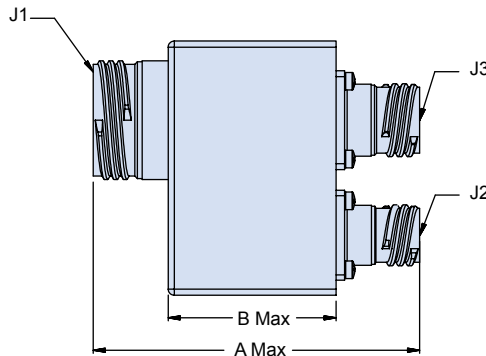
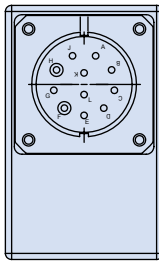
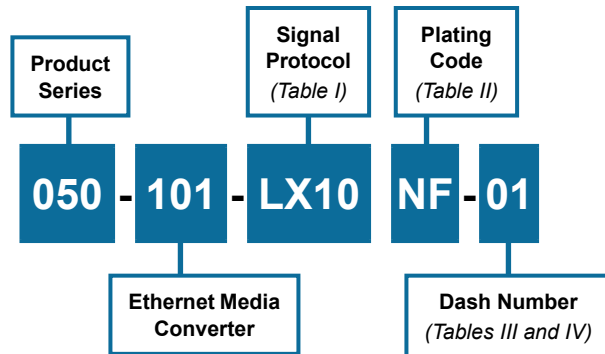
Military Specification Compliance			
Feature	Standard	Condition	Notes
Mechanical Shock	MIL-STD-810	40g	6-9ms
Mechanical Vibration	MIL-STD-810	30g RMS	18ms
ESD	MIL-STD-883	Class II	2200v
Mating Durability	MIL-STD-38999/20	500 Cycles	<0.5 db change
Flame Resistance	MIL-STD-1344	Method 1012	30 Seconds
Damp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



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



#### How To Order



F

Table I: Signal Protocol

Code	Name	Medium
-SXMM	1000BASE-SX	Multi-Mode Fiber
-LX10	1000BASE-LX10	Single-Mode Fiber

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)

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

#### 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.

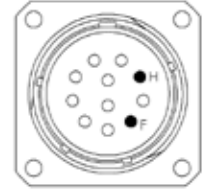

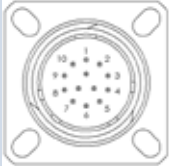
#### Assembly Notes

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



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



Table III: Mating Connectors and Pin Outs																																											
Dash No.		<b>J1: Optical Connector</b>	<b>Mating Connector</b>																																								
	Connector Part Number	233-105-00NF19-11SN (D38999/20WF11SN Type)	233-105-G6NF19-11PN (D38999/26WF11PN Type)																																								
-01	Contact Part Numbers and Locations	181-001-125 • (M29504/5-4237)	181-002-126 • (M29504/4-4208)																																								
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**Digital Visual Interface (DVI) copper to fiber media converter for High Definition Video**



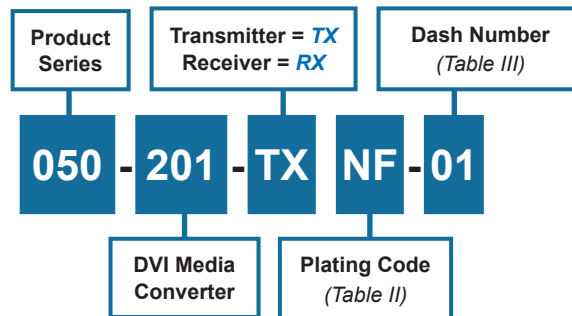
**DVI Copper to Fiber Media Converter**

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**



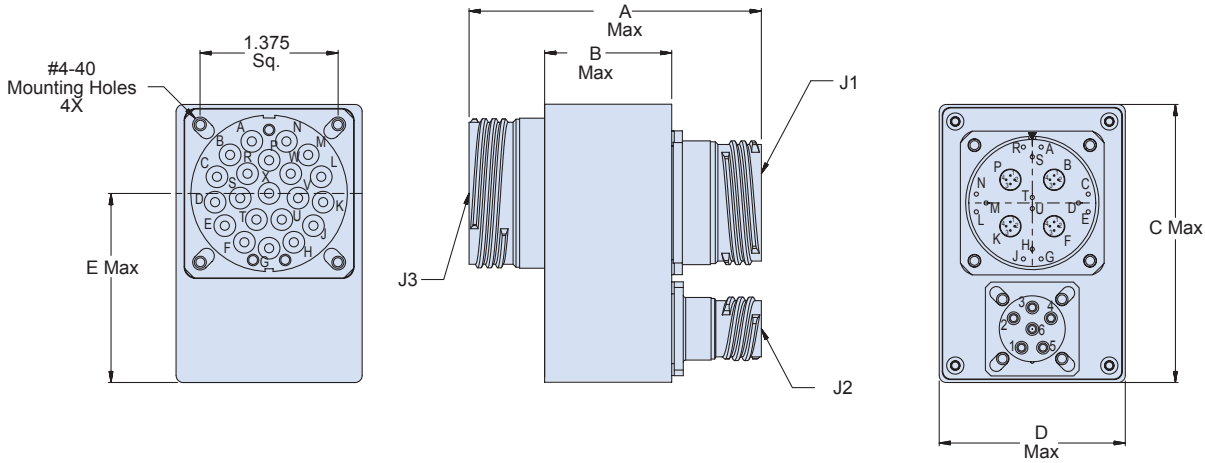
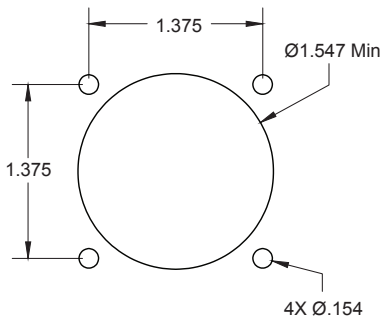


Table II: Material And Finish		
SYM	Material	Finish Description
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZN		Zinc-Nickel, Olive Drab
ZNU		Zinc-Nickel, Black

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.

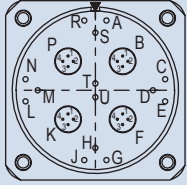
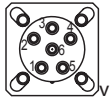
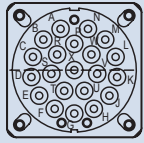
# 050-201 DVI Copper to Fiber Media Converter



**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)

***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

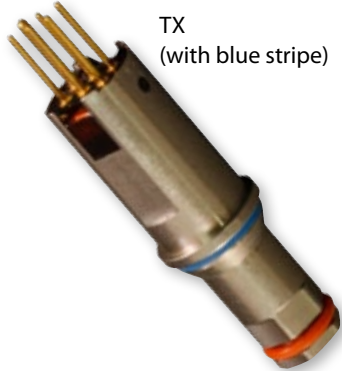
Optical Transmitters—Operating Temperature (-40°C To +85°C), Supply Voltage Vcc = 18V To 36V					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power	PO	-6.0	-4	-1	dBm
Optical Output Wavelength	$\lambda_{OUT}$	830	850	860	nm
Spectral Width(RMS)	$\Delta\lambda$			.85	nm
Extinction Ratio	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	$\lambda_{IN}$	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	

### Size 8 cavity optoelectronic insert transmitter



Patent Pending

TX  
(with blue stripe)

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.

### 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

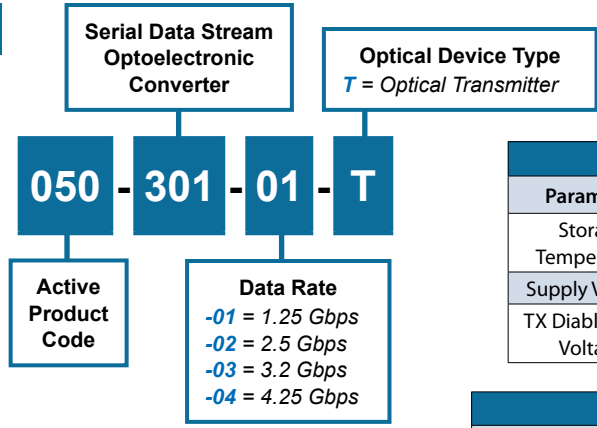




# 050-301 Optoelectronic Insert Transmitter, Size 8 Cavity Specifications



## How To Order



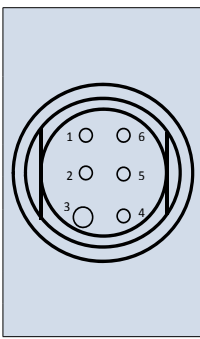
Absolute Maximum Rating					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	T <sub>s</sub>	-55		+100	°C
Supply Voltage	V <sub>cc</sub>	-0.4		+4	V
TX Disable Input Voltage	V <sub>Disable</sub>	-0.4		V <sub>cc</sub>	V

Operating Conditions					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T <sub>op</sub>	-40		+85	°C
Supply Voltages	V <sub>cc</sub>	3.14	3.3	3.46	V
Differential Input Voltage	V <sub>ID</sub>	250		2200	mV <sub>P-P</sub>
Power Supply Noise	V <sub>CC</sub> Ripple			0.15	V <sub>P-P</sub>

Optical Transmitter					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power	P <sub>out</sub>	-6.5		-1	dBm
Optical Wavelength	λ <sub>out</sub>	830	850	860	nm
Spectral Width	Δλ <sub>rms</sub>			0.85	nm
Extinction Ratio	ER	6	12		dB
Total Jitter	TJ			55	ps

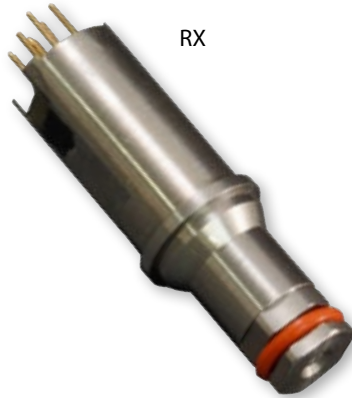
Power Supply Current V <sub>cc</sub> = 3.14 to 3.46V					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current	I <sub>cc</sub>			90	mA

Example Optical Link Distances		
Protocol	Fiber Type	Distance
Gigabit Ethernet	62.5/125μm, 200MHZ*Km	27.5 Meters
	50/125μm, 500MHZ*Km	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	V <sub>cc</sub>	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)

### 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 differential 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.

### 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

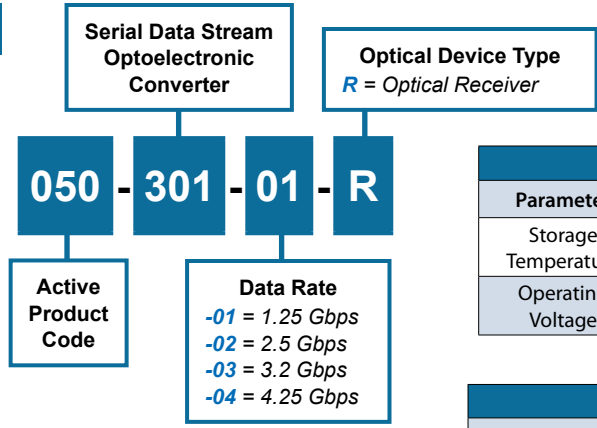
- Front-release Size #8 OE converter designed for ARINC 600
- ARINC 664, 801, 803, 804, and 818 standard Compliant
- Data rates from 125Mbps to 4.25Gbps
- Supports Fast and Gigabit Ethernet, AFDX, 1x/2x Fibre Channel, DVI, HDMI, SFPDP, Serial Rapid I/O (sRIO).
- Designed for harsh environment applications.
- 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



# 050-301 Optoelectronic Insert Receiver, Size 8 Cavity Specifications



## How To Order

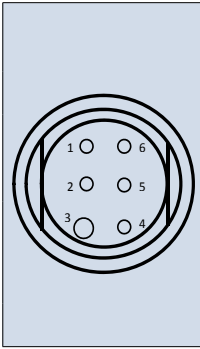


Absolute Maximum Rating					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	T <sub>s</sub>	-55		+100	°C
Operating Voltage	V <sub>cc</sub>	-0.4		+4	V

Operating Conditions					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T <sub>op</sub>	-40		+85	°C
Supply Voltages	V <sub>cc</sub>	3.14	3.3	3.46	V
Power Supply Noise	V <sub>CC</sub> Ripple			0.15	V

Optical Receiver					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity					
-01 = 1.25 Gbps		-17			dBm
-02 = 2.5 Gbps		-15			dBm
-03 = 3.2 Gbps		-15			dBm
-04 = 4.25 Gbps		-14			dBm
Optical Overload				0	dBm
Optical Wavelength	λ <sub>out</sub>	830		860	nm
Differential Output Swing (P-P)	V <sub>diff</sub>	600		1200	mV
LOS Assert Level	LOS <sub>h</sub>	-22			dBm
LOS Hysteresis	LOS <sub>HYS</sub>	1.5	2.3		dB

Power Supply Current V <sub>cc</sub> = 3.14 to 3.46V					
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current	I <sub>cc</sub>			70	mA



Electrical Pin Arrangement				
Pin Number	Symbol	Description	Logic	
1	GND	Signal Ground		
2	V <sub>cc</sub>	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)	

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 Front Release (GFR) Fiber Optic Connection System General Information



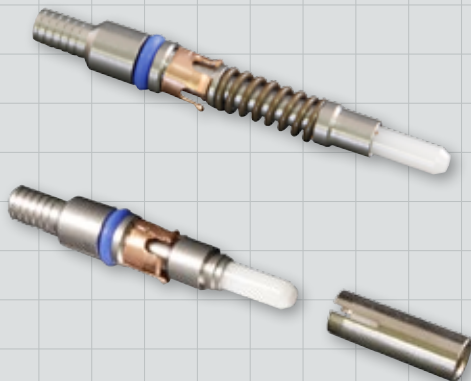
Glenair Front  
Release System

## **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.
<b>GFR Fiber Optic Termini</b>		
<b>181-011</b>	Front Release Socket Terminus, size 16	G-2
<b>181-012</b>	Front Release Pin Terminus, size 16	G-4
<b>GFR Fiber Optic Connectors</b>		
<b>180-063</b>	Micro-D GFR Receptacle Connector	G-6
<b>180-064</b>	Micro-D GFR Plug Connector	G-8
<b>180-065</b>	D-Subminiature GFR Receptacle Connector	G-10
<b>180-066</b>	D-Subminiature GFR Plug Connector	G-12



### **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°

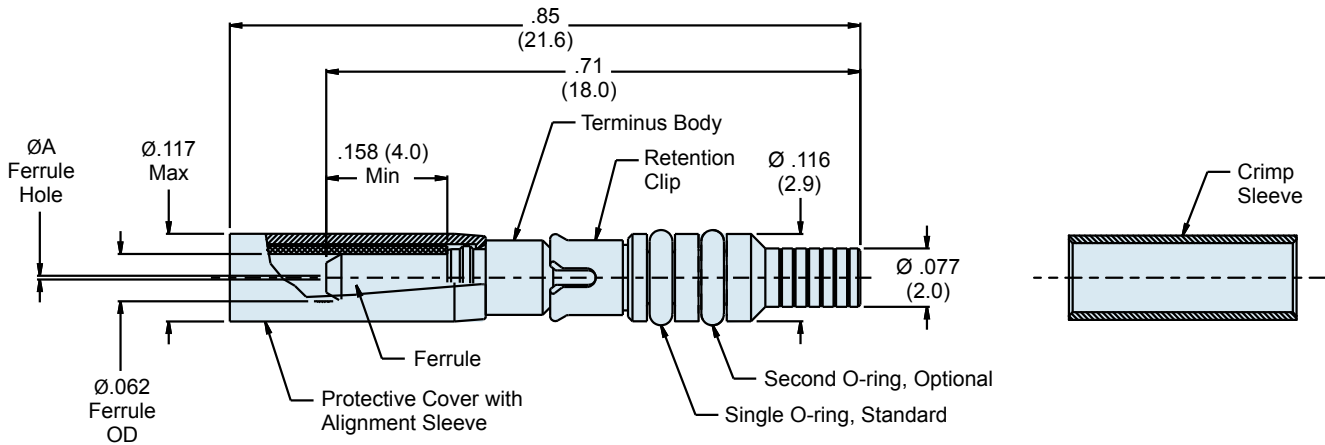
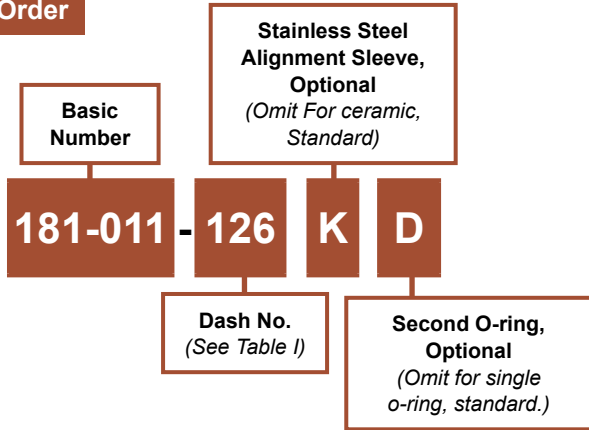


# 181-011 Glenair Front Release (GFR) Fiber Optic Socket Terminus, Size 16

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



### How To Order



### Material and Finish

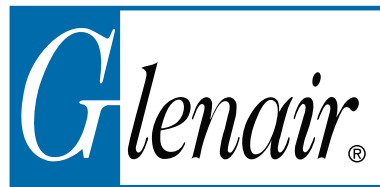
- Ferrule, Alignment Sleeve: Zirconia Ceramic
- Protective Cover: Spring Alloy/Nickel
- Terminus Body: Stainless Steel/Passivate
- Retention Clip: Spring Alloy
- O-Ring(s): Fluorosilicone
- Crimp Sleeve: Brass Alloy/Nickel

### 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.



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



**Table I: Assembly Dash Number**

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

Consult factory for additional sizes

**Table II: Tools and Accessories**

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





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

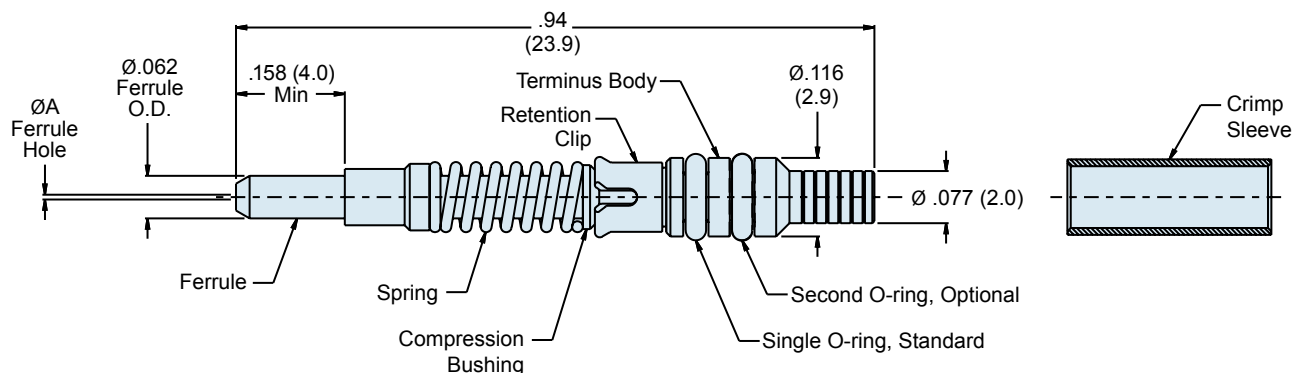
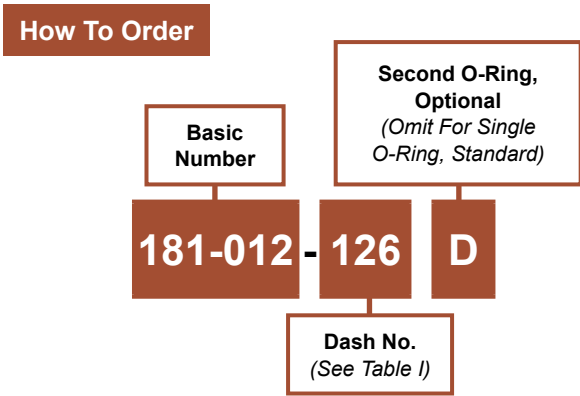
## Size 16 Glenair front release (GFR) fiber optic pin terminus



Single O-Ring Design (Standard)



Dual O-Ring Design



### 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, and 181-051 for dummy terminus

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



Glenair Front  
Release System

**Table I: Assembly Dash Number**

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

Consult factory for additional sizes

**Table II: Tools and Accessories**

Part Number	Description
<b>265-002</b>	Crimp Sleeve, Ø 2.2mm Max Jacket
<b>182-005P</b>	Polishing Tool
<b>182-012</b>	Crimp Tool
<b>182-013</b>	Insertion Tool, Straight
<b>182-014</b>	Insertion Tool, 90 Degree
<b>182-015</b>	Removal Tool



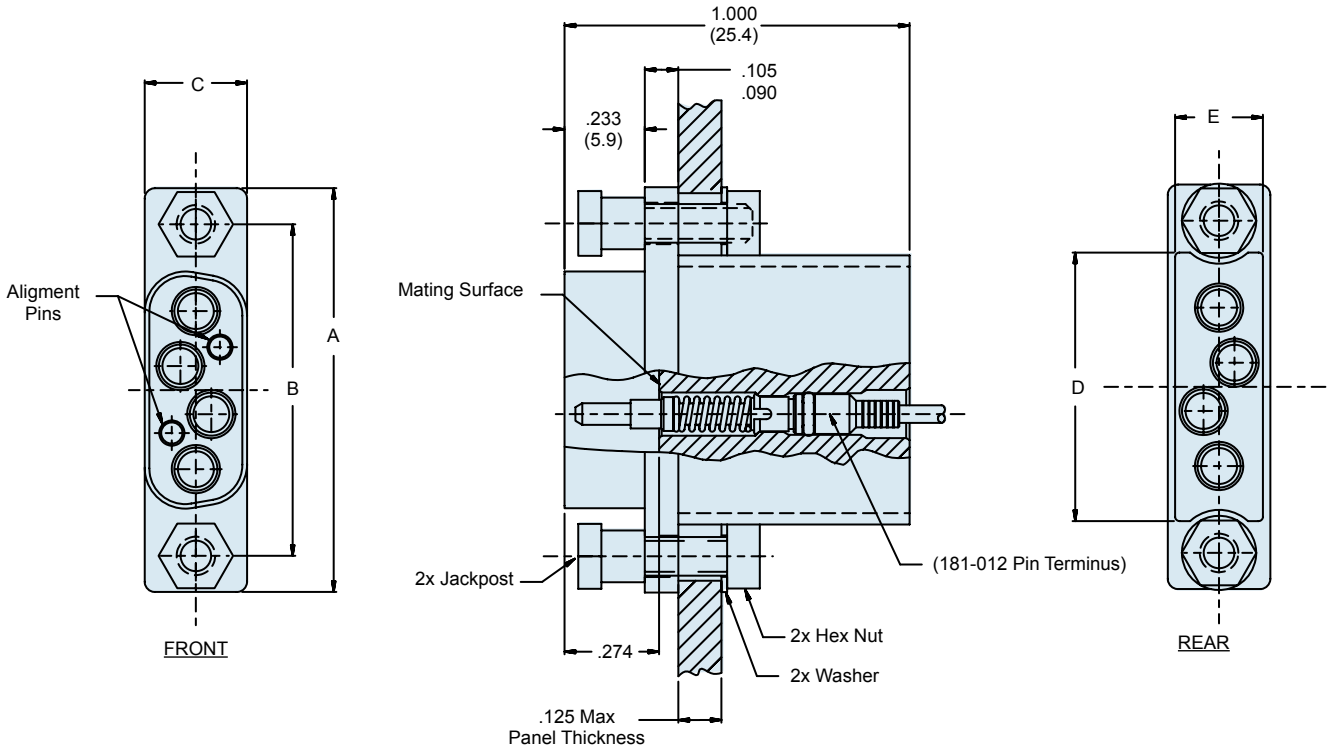
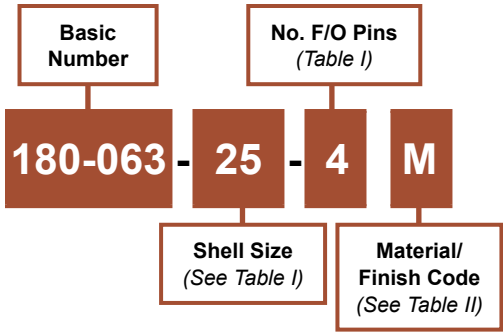


# 180-063 Micro-D Fiber Optic Receptacle Connector for Glenair Front Release Pin Terminus 181-012

## Micro-D GFR fiber optic receptacle connector



### How To Order



### 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.

180-063

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



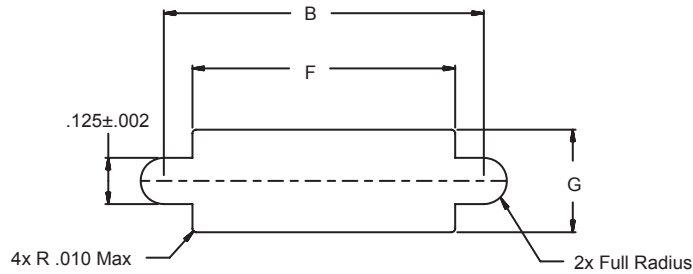
Glenair Front  
Release System

**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

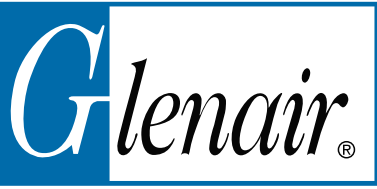
**Table II: Material/Finish**

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



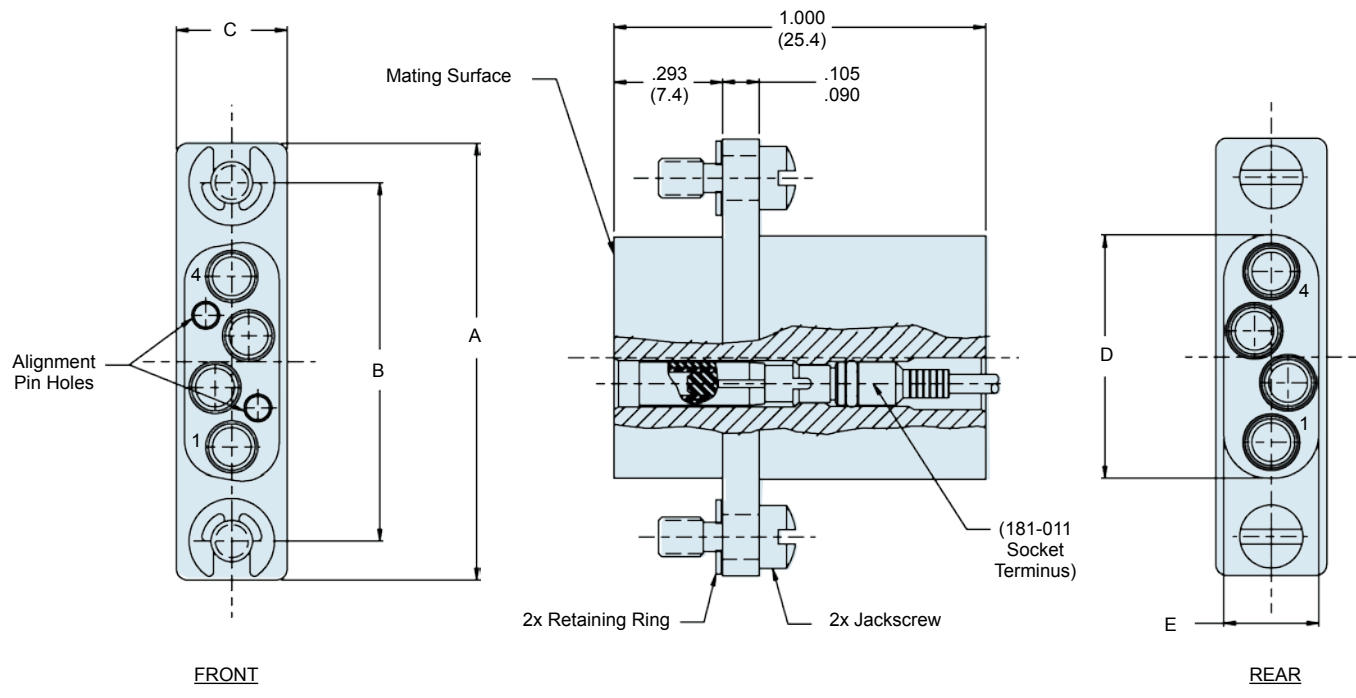
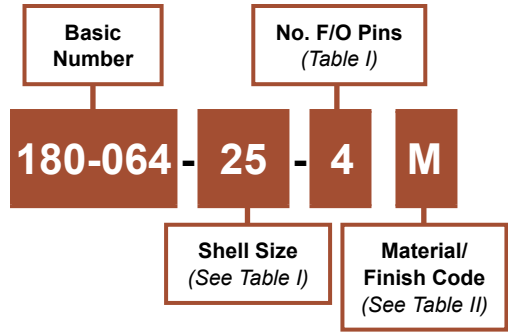


# 180-064 Micro-D Fiber Optic Plug Connector for Glenair Front Release Socket Terminus 181-011

## Micro-D GFR fiber optic plug connector



### How To Order



### 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.



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



**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



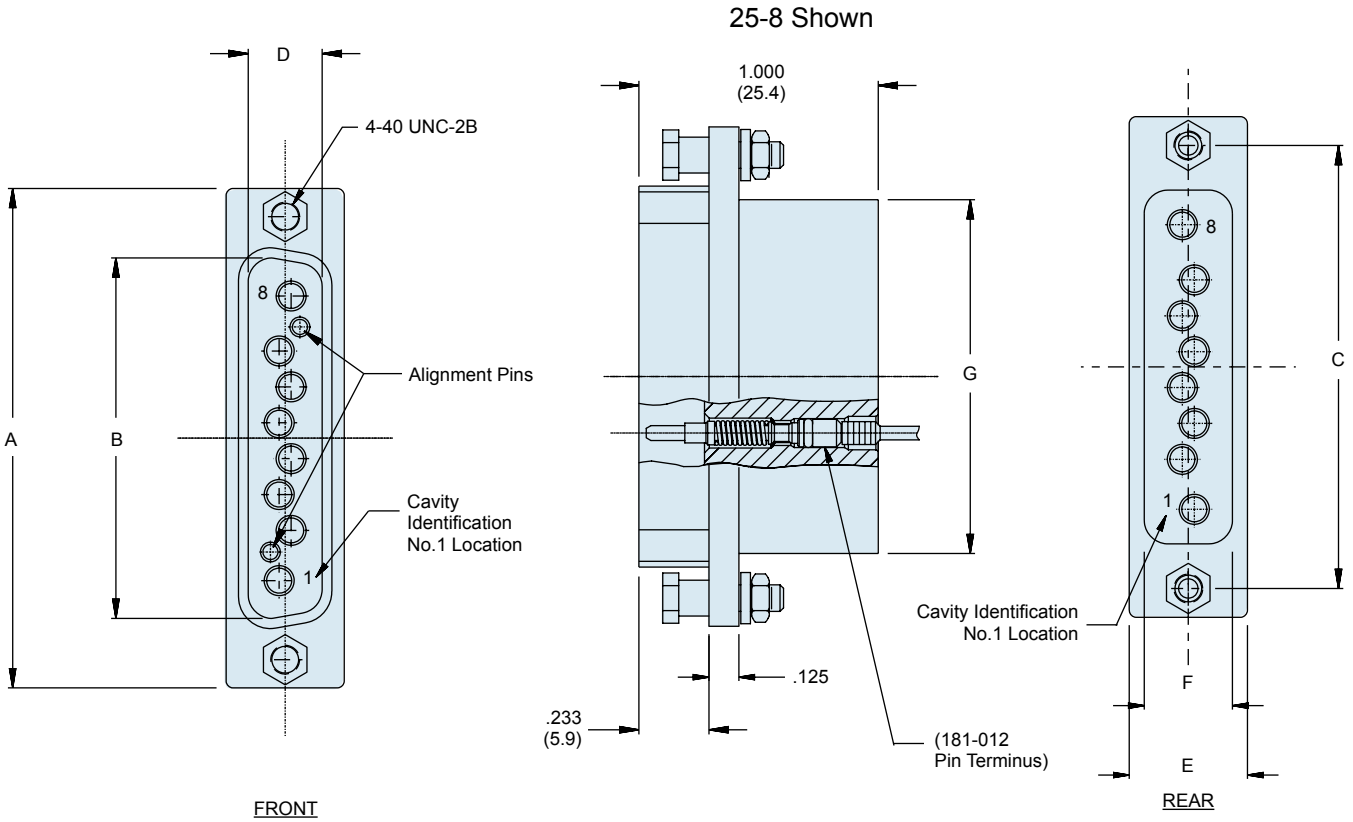
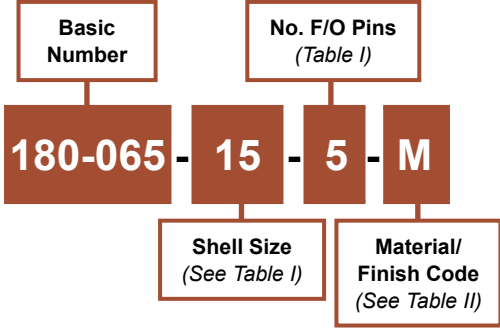


# 180-065 D-Subminiature Fiber Optic Receptacle for Glenair Front Release Pin Terminus 181-012

## D-subminiature GFR fiber optic receptacle



### How To Order



### 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.

180-065

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



Glenair Front  
Release System

**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
<b>9</b>	1.213 (30.8)	.666 (16.9)	.984 (25.0)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.650 (16.5)	4
<b>15</b>	1.545 (39.2)	.994 (25.2)	1.312 (33.3)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.932 (23.7)	5
<b>25</b>	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
<b>50</b>	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

G

**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



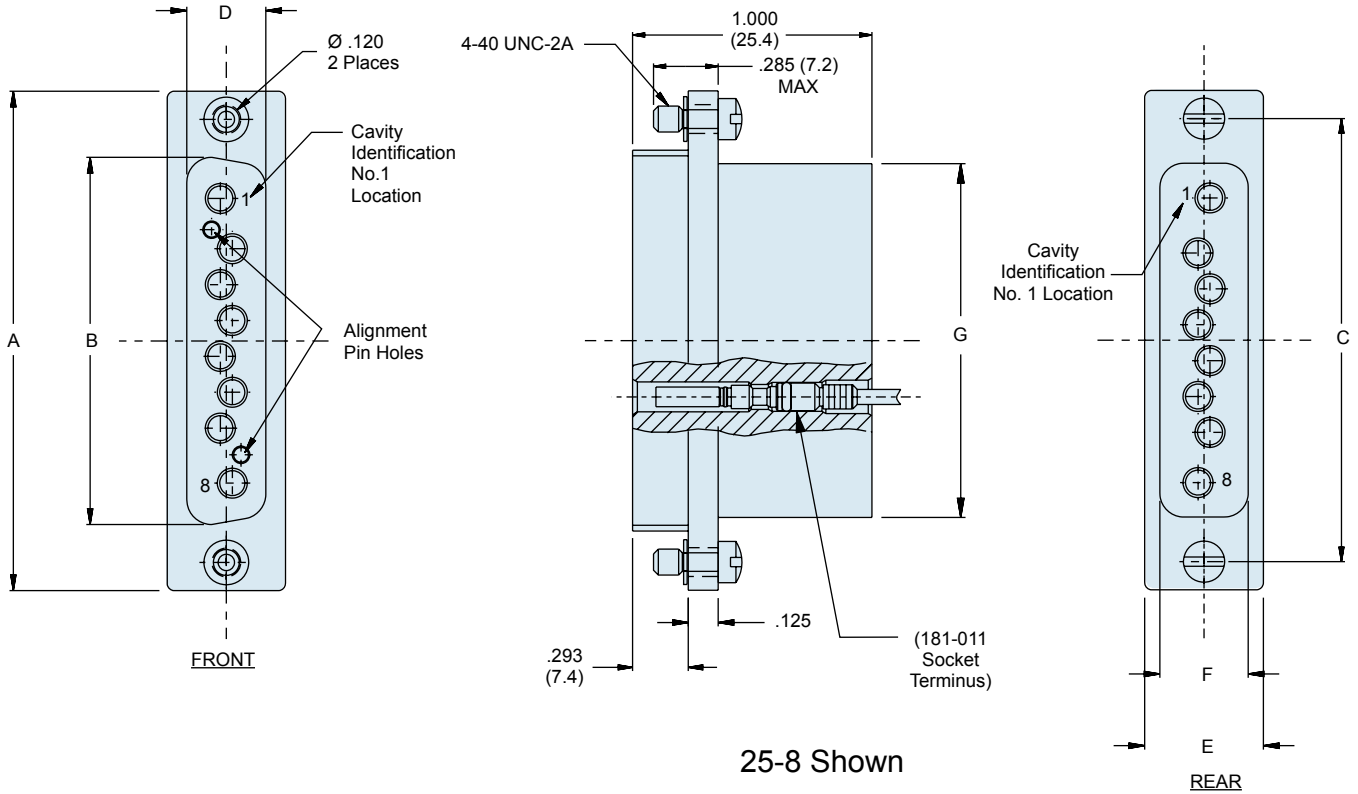
# 180-066

## 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 <i>(Table I)</i>
180-066	-	15	-	5
		Shell Size <i>(See Table I)</i>		
		Material/ Finish Code <i>(See Table II)</i>		
		-		
		M		



**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.

180-066

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



Glenair Front  
Release System

**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
<b>9</b>	1.213 (30.8)	.643 (16.3)	.984 (25.0)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.650 (16.5)	4
<b>15</b>	1.545 (39.2)	.968 (24.6)	1.312 (33.3)	.330 (8.4)	.498 (12.6)	.369 (9.4)	.932 (23.7)	5
<b>25</b>	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
<b>50</b>	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

G

**Table II: Material/Finish**

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

**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.





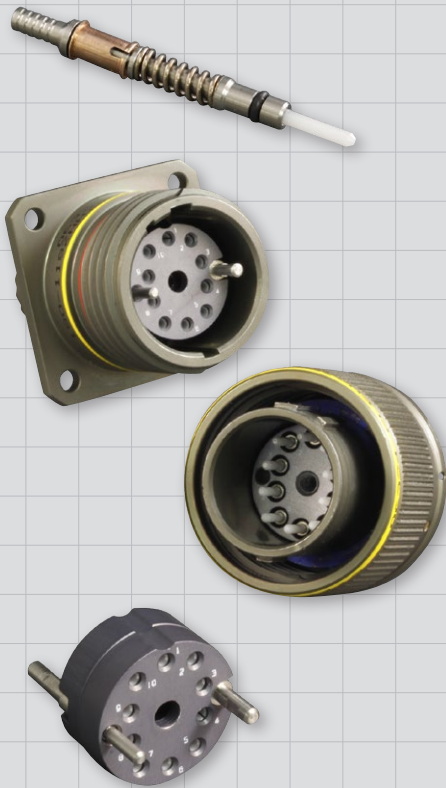
**Next Generation Fiber Optic Connection System  
MIL-PRF-64266 (NGCON)  
General Information**



MIL-PRF-64266  
(NGCON)

**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.
<b>NGCON Fiber Optic Termini</b>		
<b>181-043</b>	Genderless Rear-Release Terminus	H-2
<b>NGCON Fiber Optic Connectors</b>		
<b>180-118 (06)</b>	Plug Connector	H-4
<b>180-118 (H7)</b>	Square Flange Wall Mount Receptacle	H-5
<b>180-118 (08)</b>	Jam Nut Mount Receptacle	H-6
<b>180-118ASR</b>	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 maintenance**
- **Plug, wall mount receptacle and jam nut mount receptacle configurations**
- **Rear release precision 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.**



**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°



**181-043**  
**MIL-PRF-29504/18 Type Terminus**  
 for MIL-PRF-62466 (NGCON) Fiber Optic Connectors



**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-XX Non-Keyed	Ref. M29504/20-XX Keyed
181-043-1250C	181-043K-1250C	125.0	SM	9/125	M29504/18-01	M29504/20-01
181-043-1255C	181-043K-1255C	125.5	SM	9/125	M29504/18-02	M29504/20-02
181-043-1265C	181-043K-1265C	126.0	SM/MM	9/125, 50/125, 62.5/125	M29504/18-03	M29504/20-03
181-043-126C	181-043K-126C	126.0	MM	50/125, 62.5/125	M29504/18-26	M29504/20-26
181-043-127C	181-043K-127C	127.0	MM	50/125, 62.5/125	M29504/18-27	M29504/20-27
181-043-142C	181-043K-142C	142.0	MM	100/140	M29504/18-42	M29504/20-42
181-043-145C	181-043K-145C	145.0	MM	100/140	M29504/18-45	M29504/20-45
181-043-156C	181-043K-156C	156.0	MM	62.5/125/155	M29504/18-56	M29504/20-56
181-043-157C	181-043K-157C	157.0	MM	62.5/125/155	M29504/18-57	M29504/20-57
181-043-173C	181-043K-173C	173.0	MM	100/140/172	M29504/18-73	M29504/20-73
181-043-175C	181-043K-175C	175.0	MM	100/140/172	M29504/18-75	M29504/20-75

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

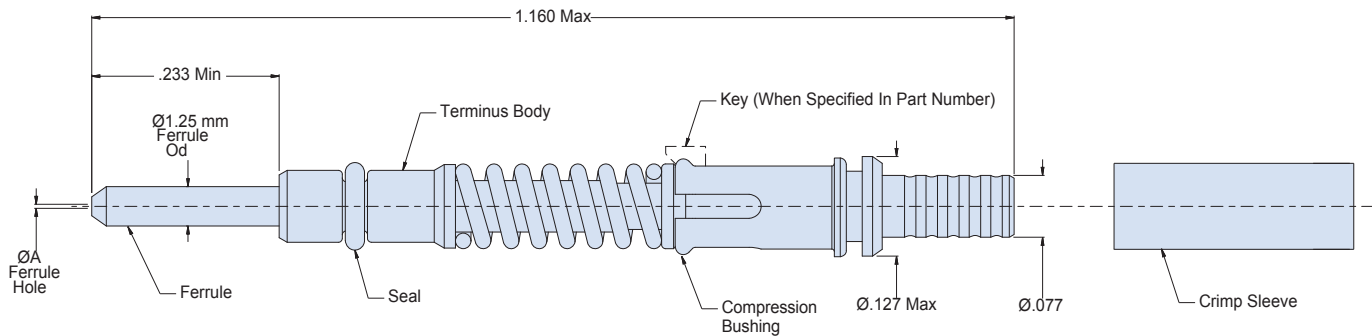


Table II: Accessories	
Part No.	Description
181-043-C	Crimp Sleeve, Ø2.4mm Max Jacket
182-012	Crimp tool
182-013	Insertion tool, straight
182-014	Insertion tool, 90°
182-021	Hand polishing tool
182-025	Removal tool

**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

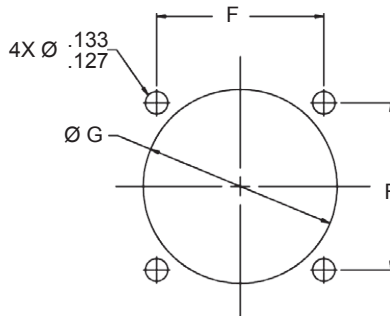


Table I: Material and Finish		
Code	Material	Description
ME	Aluminum Alloy	Electroless Nickel
MT		Nickel-PTFE, Grey
ZN		Zinc-Nickel, Olive Drab
ZR		Zinc-Nickel, Black
Z1	Stainless Steel	Passivate

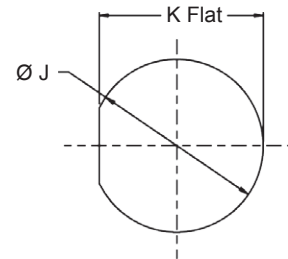
Table II				
Shell Size	Shell Size Code (Ref)	Insert Arrangement	AA Thread	BB Thread
11	B	2 or 4	M15 x 1.0-6g 0.100R	.7500-.1P-.2L-DS
13	C	6	M18 x 1.0-6g 0.100R	.8750-.1P-.2L-DS
15	D	8 or 10	M22 x 1.0-6g 0.100R	1.0625-.1P-.2L-DS
23	H	18 or 36	M34 x 1.0-6g 0.100R	1.5000-.1P-.2L-DS

Table III: Dimension										
Shell Size	Shell Size Code (Ref)	Ø A Max	C ±.010	E ±.015	F	Ø G ±.005	Ø J ±.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



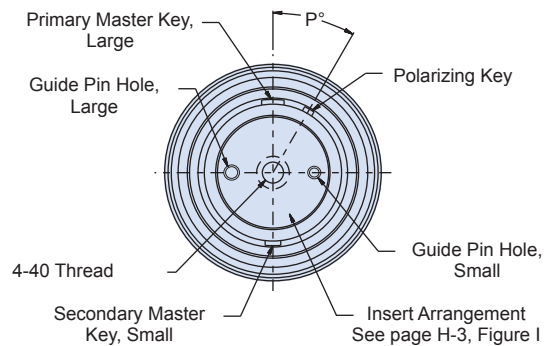
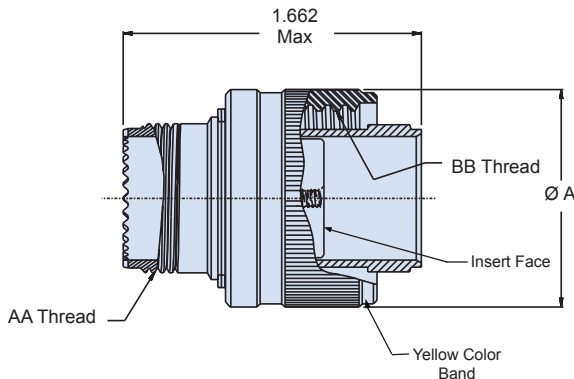
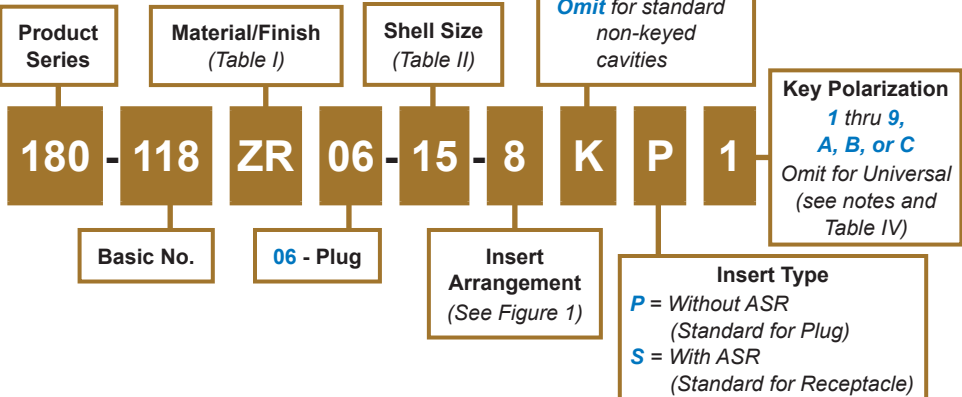
Figure I: Insert Arrangements						
Shell Size 11 Arrangement 2	Shell Size 11 Arrangement 4	Shell Size 13 Arrangement 6	Shell Size 15 Arrangement 8	Shell Size 15 Arrangement 10	Shell Size 23 Arrangement 18	Shell Size 23 Arrangement 36

Plug front face shown. Receptacle front face - opposite

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



## How To Order



## 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 separately. 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.

180-118 (H7)

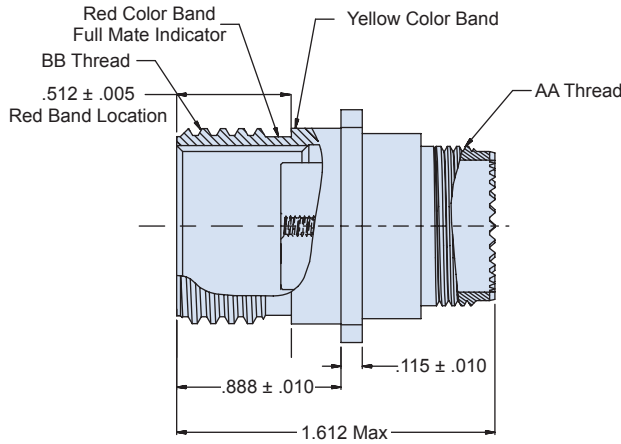
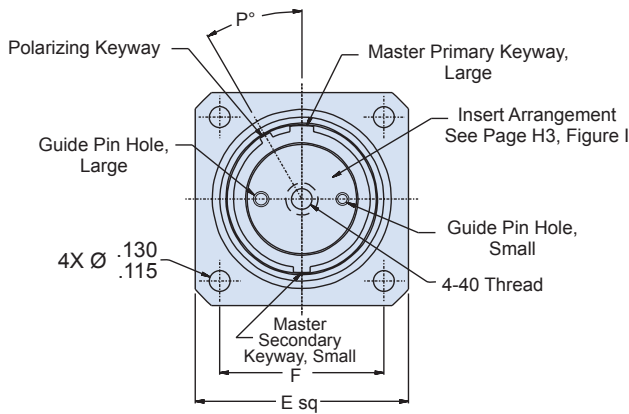
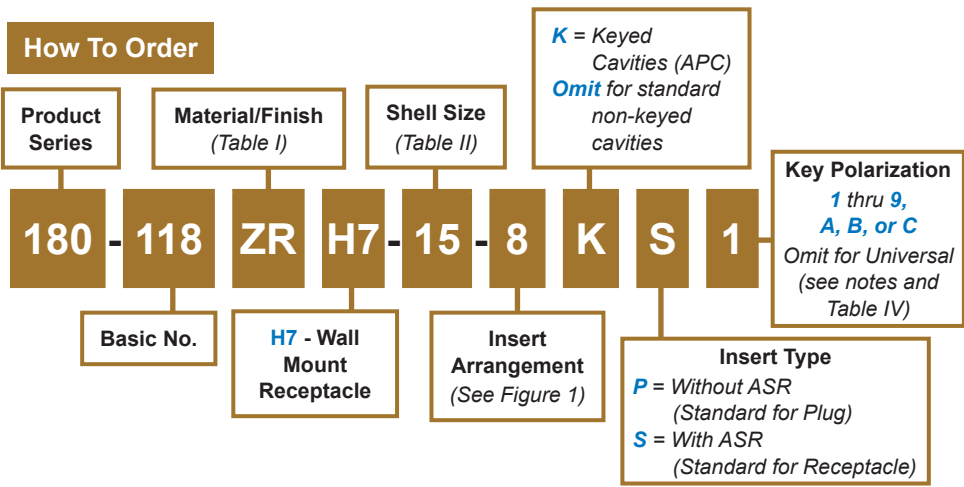
Next Generation MIL-PRF-64266/1 (NGCON) Type Fiber Optic Square Flange Wall Mount Receptacle



MIL-PRF-64266 (NGCON)



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



**H7 - Wall Mount Receptacle**  
Standard receptacle configuration supplied with ASR, not shown (Insert type = S)



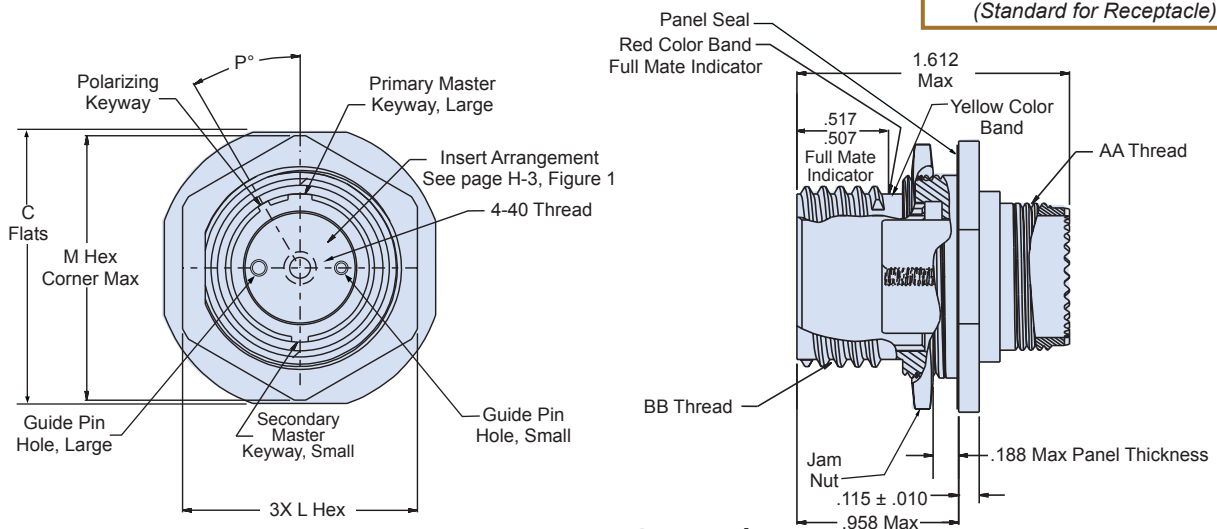
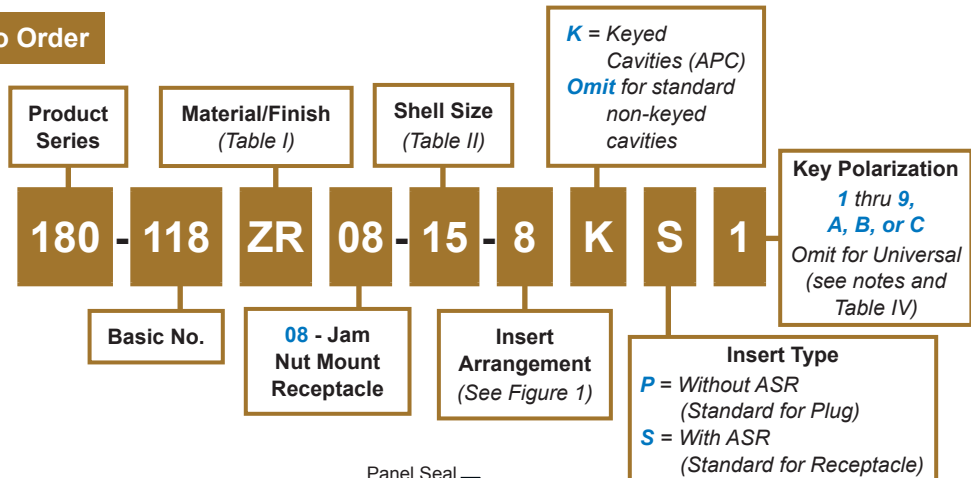
**Material and Finish**  
 Shell: See Table I  
 Insert: Al Alloy/Anodize, or high grade engineering thermoplastic- mfr's option  
 Alignment sleeve retainer (ASR): Al Alloy/Anodize  
 Alignment sleeves: Zirconia ceramic  
 Misc. hardware: Stainless steel/Passivate

**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 separately. 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.



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

### How To Order



### 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 separately. 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.



180-118ASR

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



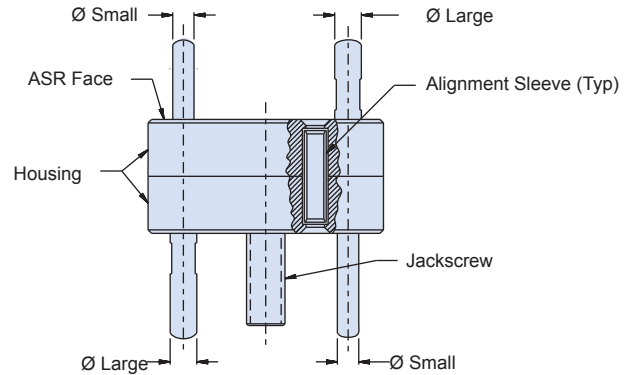
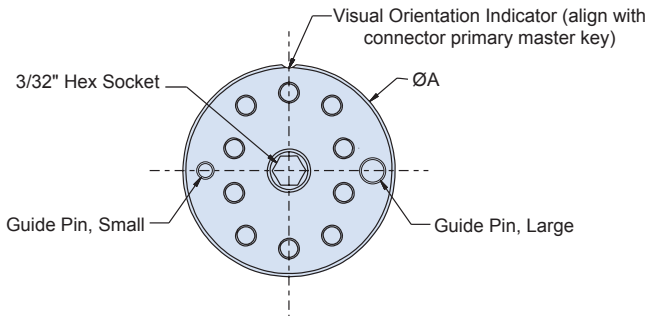
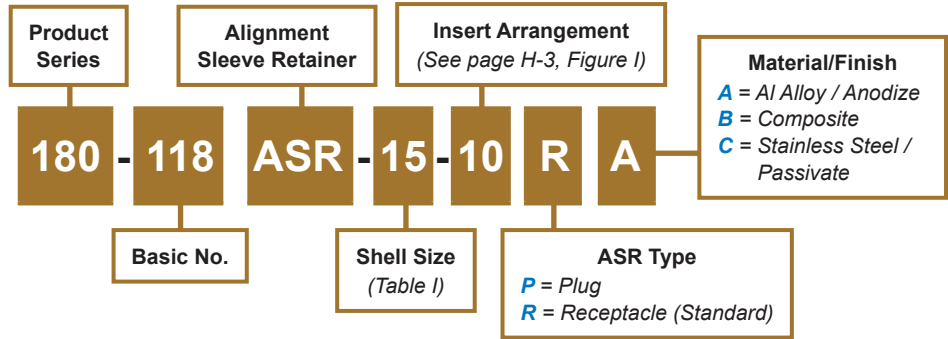
MIL-PRF-64266  
(NGCON)



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



How To Order



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



FIBER OPTIC

# GLENAIR GFOCA

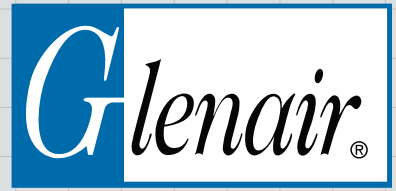
FIBER OPTIC CONNECTION SYSTEM



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.

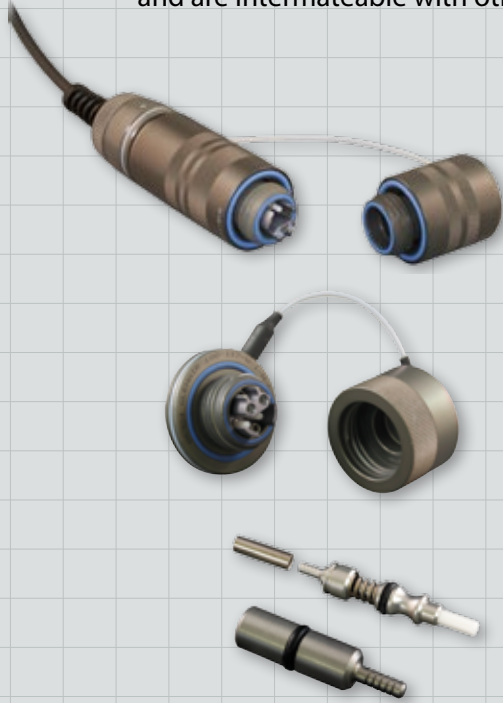


# Glenair MIL-DTL-83526 Type (GFOCA) 4 Channel Fiber Optic Connection System General Information



## 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.
<b>MIL-PRF-29504/16 and /17 Type Fiber Optic Termini</b>		
<b>181-050</b>	Pin Terminus, M29504/16 Type	I-2
<b>181-059</b>	Dummy Terminus, M29504/17 Type	I-3
<b>MIL-DTL-83526/16 and /17 Type Fiber Optic Connectors</b>		
<b>180-145</b>	MIL-DTL-83526/16 Type Plug Connector, Hermaphroditic, 4 Channel	I-4
<b>180-146</b>	MIL-DTL-83526/17 Type Jam Nut Receptacle, 4 Channel	I-6
<b>180-147</b>	Type Square Flange Receptacle, 4 Channel	I-8
<b>180-148</b>	Type Jam Nut Receptacle, 4 Ch, Internal Mount	I-10
<b>180-149</b>	Type Jam Nut Receptacle, 4 Channel, Internal Mount with Accessory Threads	I-12
<b>180-150</b>	Type Jam Nut Receptacle, 4 Channel, Panel Mount with Accessory Threads	I-14
<b>180-153</b>	Type Jam Nut Receptacle, 4 Channel, Internal Mount with Strain Relief	I-16
<b>180-137</b>	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°



# 181-050 M29504/16 Type Genderless GFOCA Fiber Optic Terminus



## 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

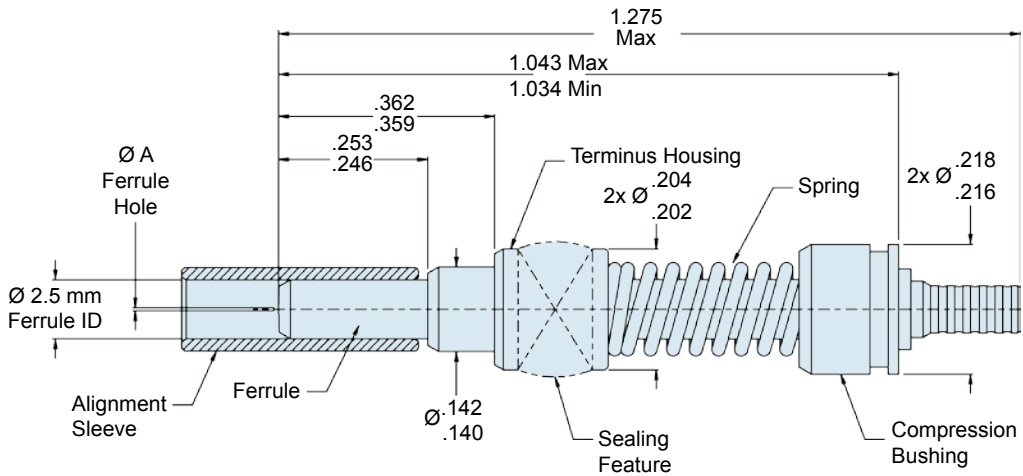


Table II: Terminus Accessories	
Part Number	Description
181-050-S	Alignment Sleeve Split, Ceramic
265-008	Crimp Sleeve

### 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

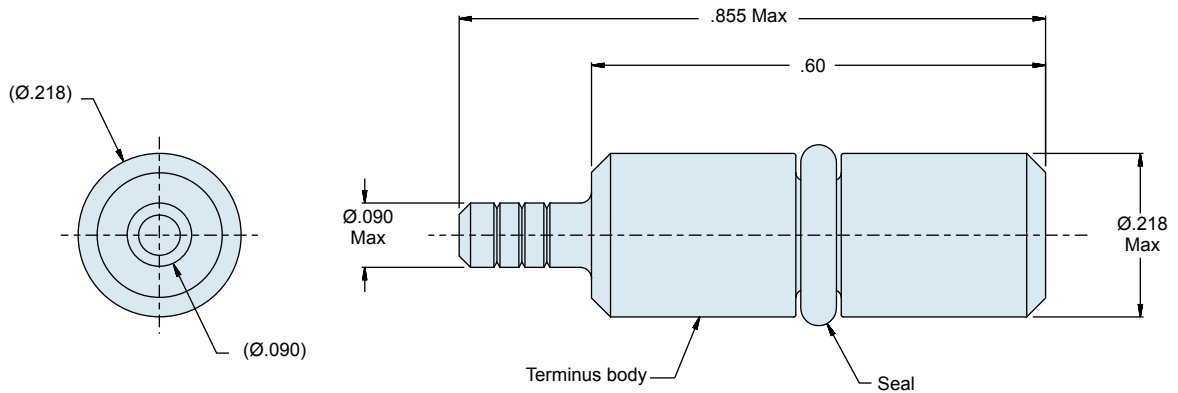
**181-059**  
**M29504/17 Type**  
**GFOCA Fiber Optic Dummy Terminus**



**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)



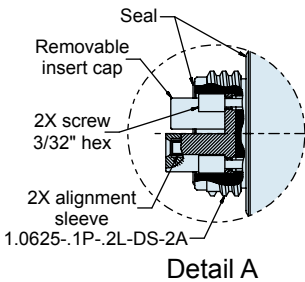
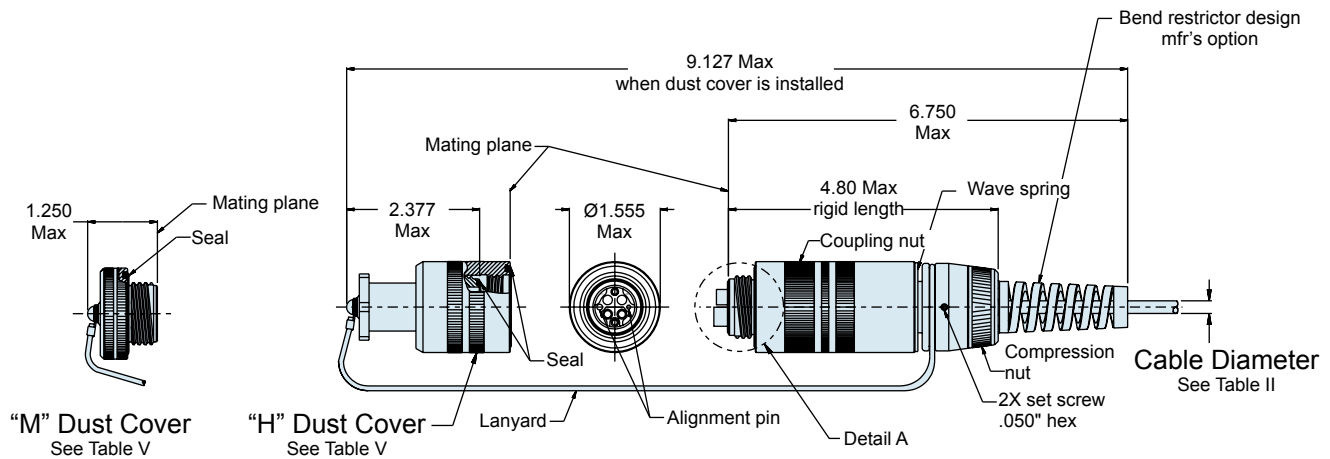
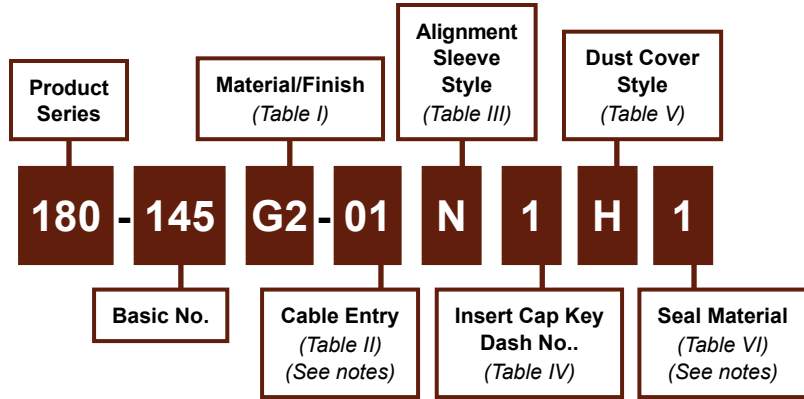


**180-145**  
**GFOCA Hermaphroditic Plug Connector**  
**MIL-DTL-83526/16 Type, 4 Channel**



**MIL-DTL-83526/16 type plug-to-plug hermaphroditic GFOCA connector, 4 channel**

**How To Order**



**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.



**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.	<p style="text-align: center;"><b>Key 1</b></p>	<p style="text-align: center;"><b>Key 2</b></p>	<p style="text-align: center;"><b>Key 3</b></p>	<p style="text-align: center;"><b>Key U (universal)</b></p>

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

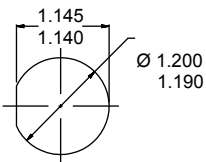
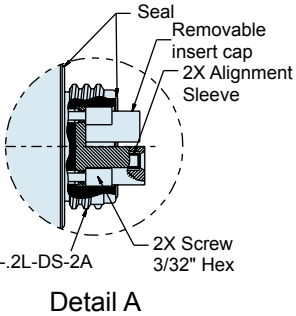
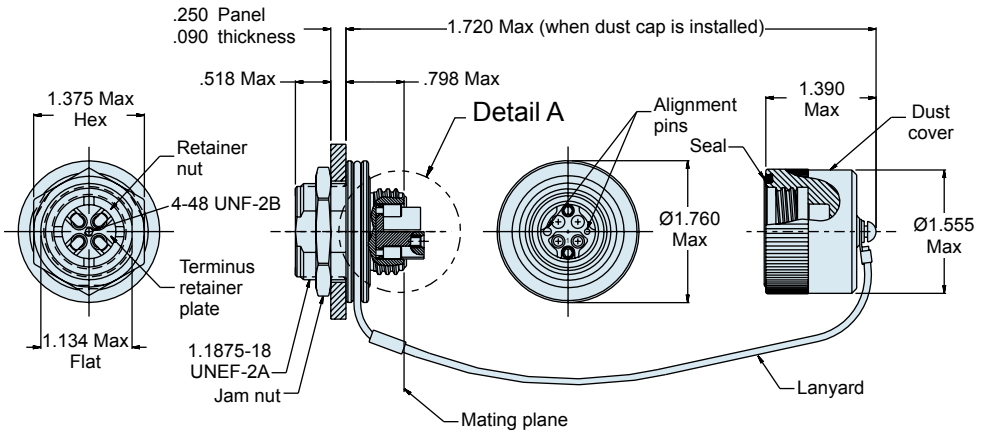
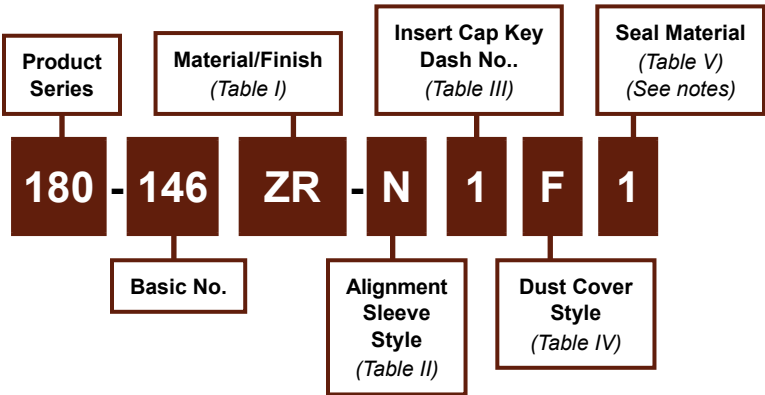


**180-146**  
**GFOCA Jam Nut Mount Receptacle**  
**MIL-DTL-83526/17 Type, 4 Channel**



**MIL-DTL-83526/17 type hermaphroditic GFOCA jam nut receptacle, 4 channel**

**How To Order**



**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.

**180-146**  
**GFOCA Jam Nut Mount Receptacle**  
**MIL-DTL-83526/17 Type, 4 Channel**

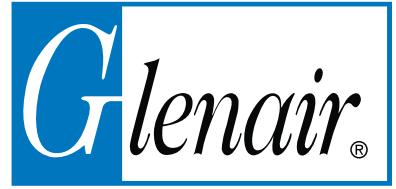


Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

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.	<p style="text-align: center;"><b>Key 1</b></p>	<p style="text-align: center;"><b>Key 2</b></p>	<p style="text-align: center;"><b>Key 3</b></p>	<p style="text-align: center;"><b>Key U (universal)</b></p>

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

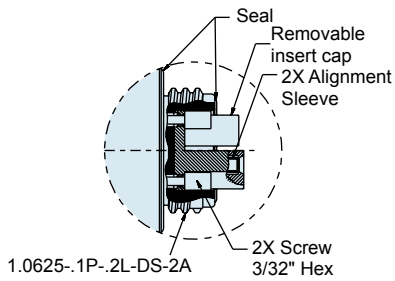
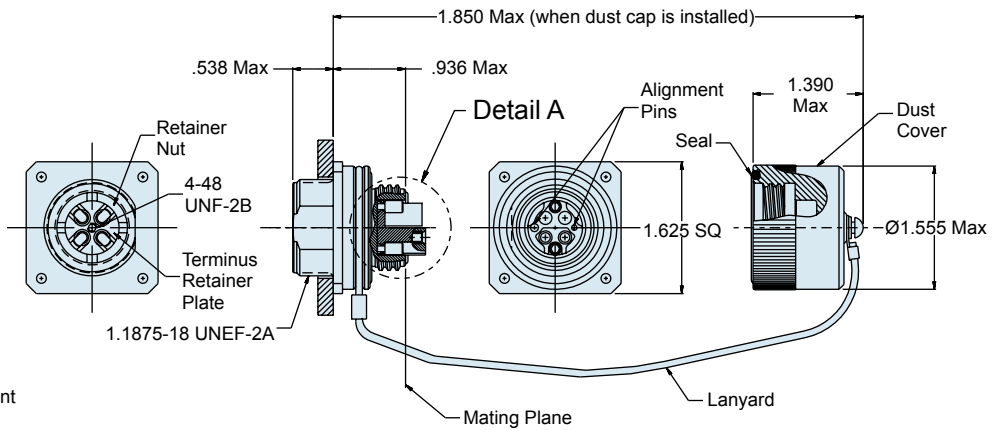
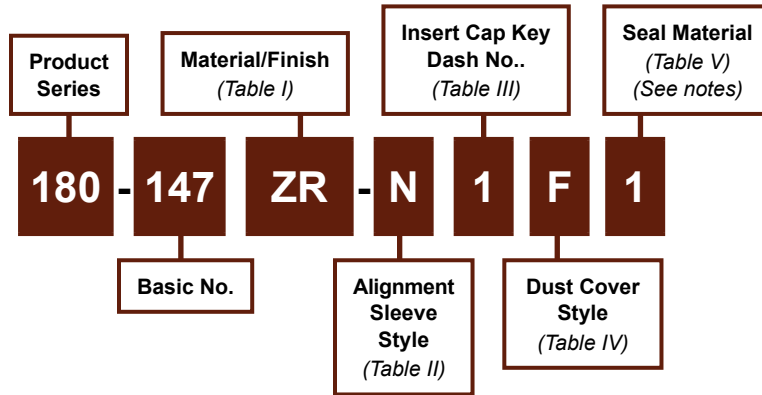


**180-147**  
**GFOCA Square Flange Mount Receptacle**  
**MIL-DTL-83526 Type, 4 Channel**

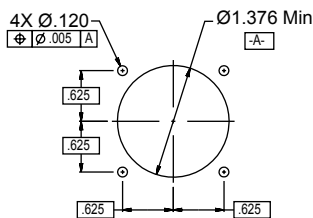


**MIL-DTL-83526/18 type hermaphroditic GFOCA square flange receptacle, 4 channel**

**How To Order**



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.

**180-147**  
**GFOCA Square Flange Mount 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.	<p style="text-align: center;"><b>Key 1</b></p>	<p style="text-align: center;"><b>Key 2</b></p>	<p style="text-align: center;"><b>Key 3</b></p>	<p style="text-align: center;"><b>Key U (universal)</b></p>

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

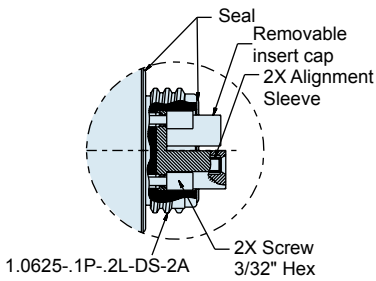
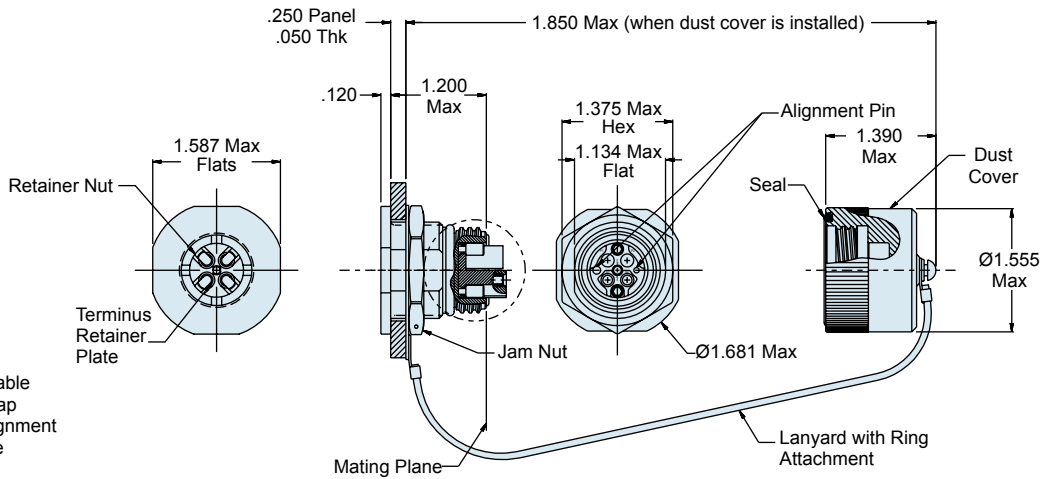
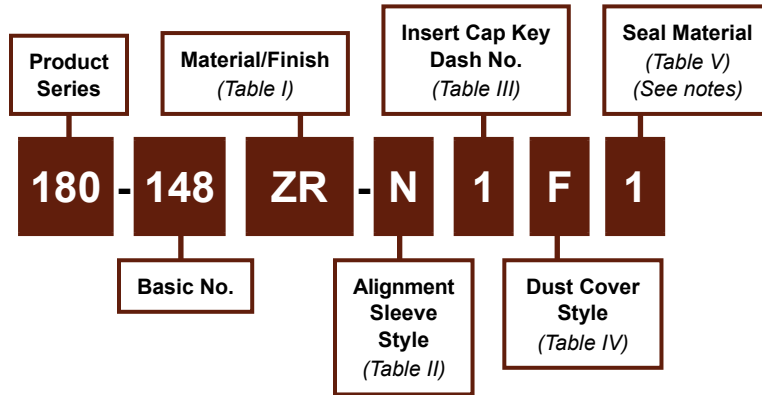


**180-148**  
**GFOCA Internal Mount Jam Nut Receptacle**  
**MIL-DTL-83526 Type, 4 Channel**

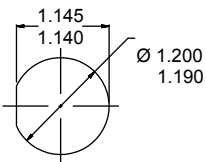


**MIL-DTL-83526 type hermaphroditic GFOCA internal mount jam nut receptacle**

**How To Order**



**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.



**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.	<p style="text-align: center;"><b>Key 1</b></p>	<p style="text-align: center;"><b>Key 2</b></p>	<p style="text-align: center;"><b>Key 3</b></p>	<p style="text-align: center;"><b>Key U (universal)</b></p>

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

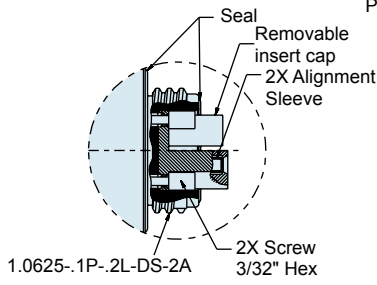
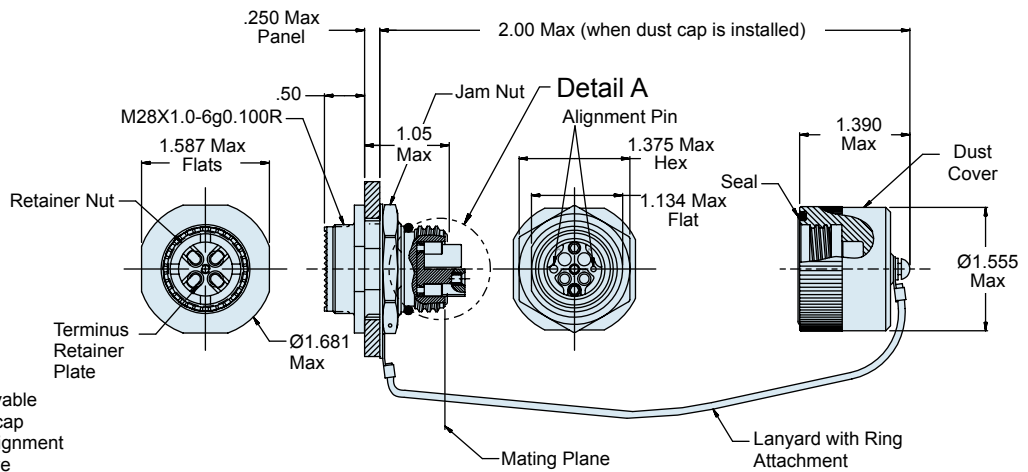
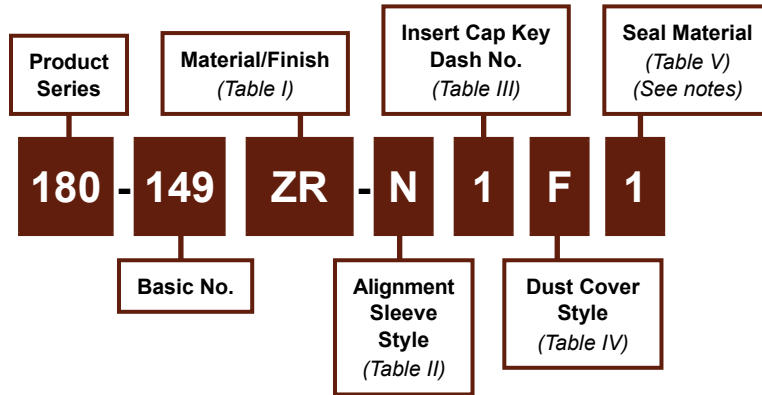


**180-149**  
**GFOCA Internal Mount Jam Nut Receptacle**  
**with Accessory Threads**  
**MIL-DTL-83526 Type Type, 4 Channel**

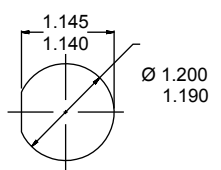


**MIL-DTL-83526 type hermaphroditic GFOCA internal mount jam nut receptacle with accessory threads**

**How To Order**



**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.

**180-149**  
**GFOCA Internal Mount Jam Nut Receptacle**  
**with Accessory Threads**  
**MIL-DTL-83526 Type, 4 Channel**

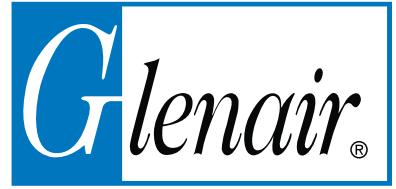


Table I: Material/Finish		
Code	Material	Finish Description
G2	Aluminum alloy	Hard anodize, gray
ZN		Zinc-nickel, olive drab
ZR		Zinc-nickel, black

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.	<p style="text-align: center;"><b>Key 1</b></p>	<p style="text-align: center;"><b>Key 2</b></p>	<p style="text-align: center;"><b>Key 3</b></p>	<p style="text-align: center;"><b>Key U (universal)</b></p>

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

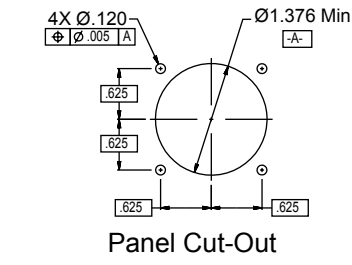
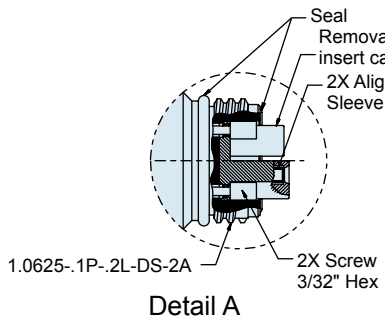
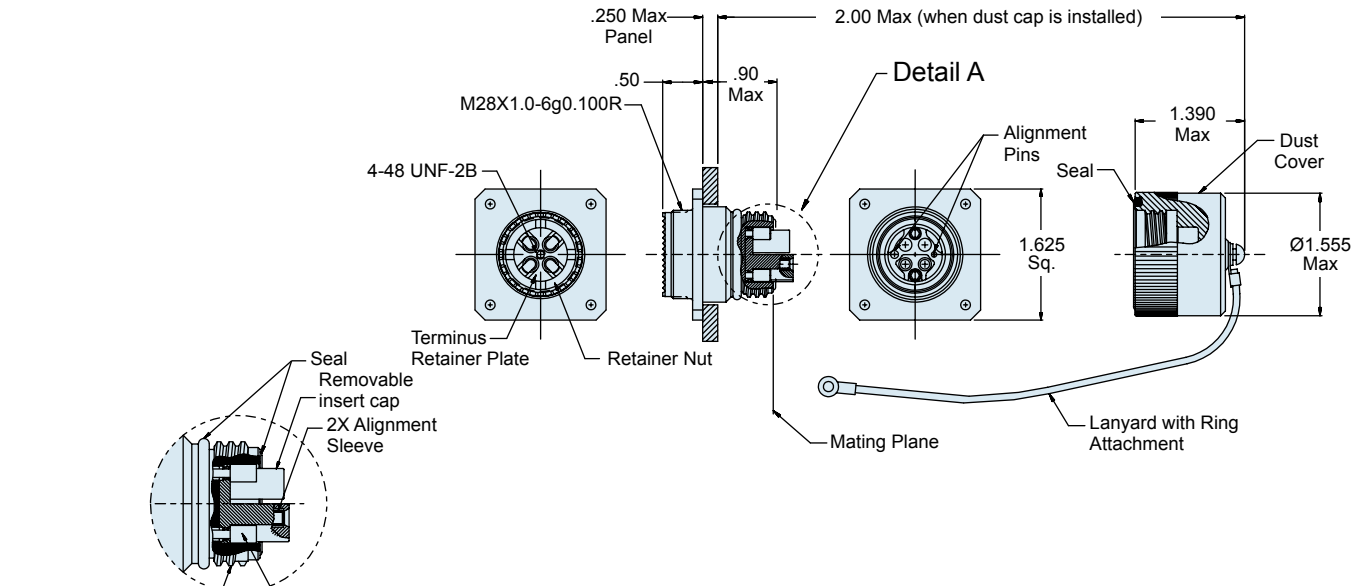
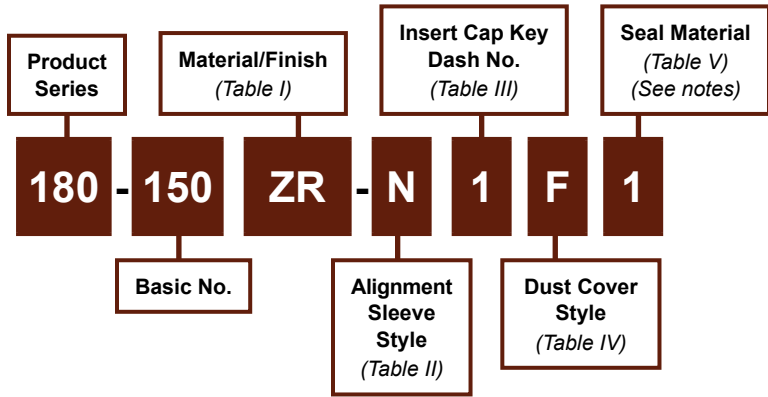


**180-150**  
**GFOCA Square Flange Mount Receptacle**  
**with Accessory Threads**  
**MIL-DTL-83526 Type, 4 Channel**



**MIL-DTL-83526 type hermaphroditic GFOCA square flange mount receptacle with accessory threads**

**How To Order**



**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.

**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

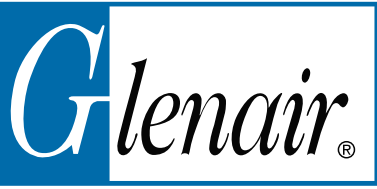
Refer to Appendix for material/finish details

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.	<p style="text-align: center;"><b>Key 1</b></p>	<p style="text-align: center;"><b>Key 2</b></p>	<p style="text-align: center;"><b>Key 3</b></p>	<p style="text-align: center;"><b>Key U (universal)</b></p>

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

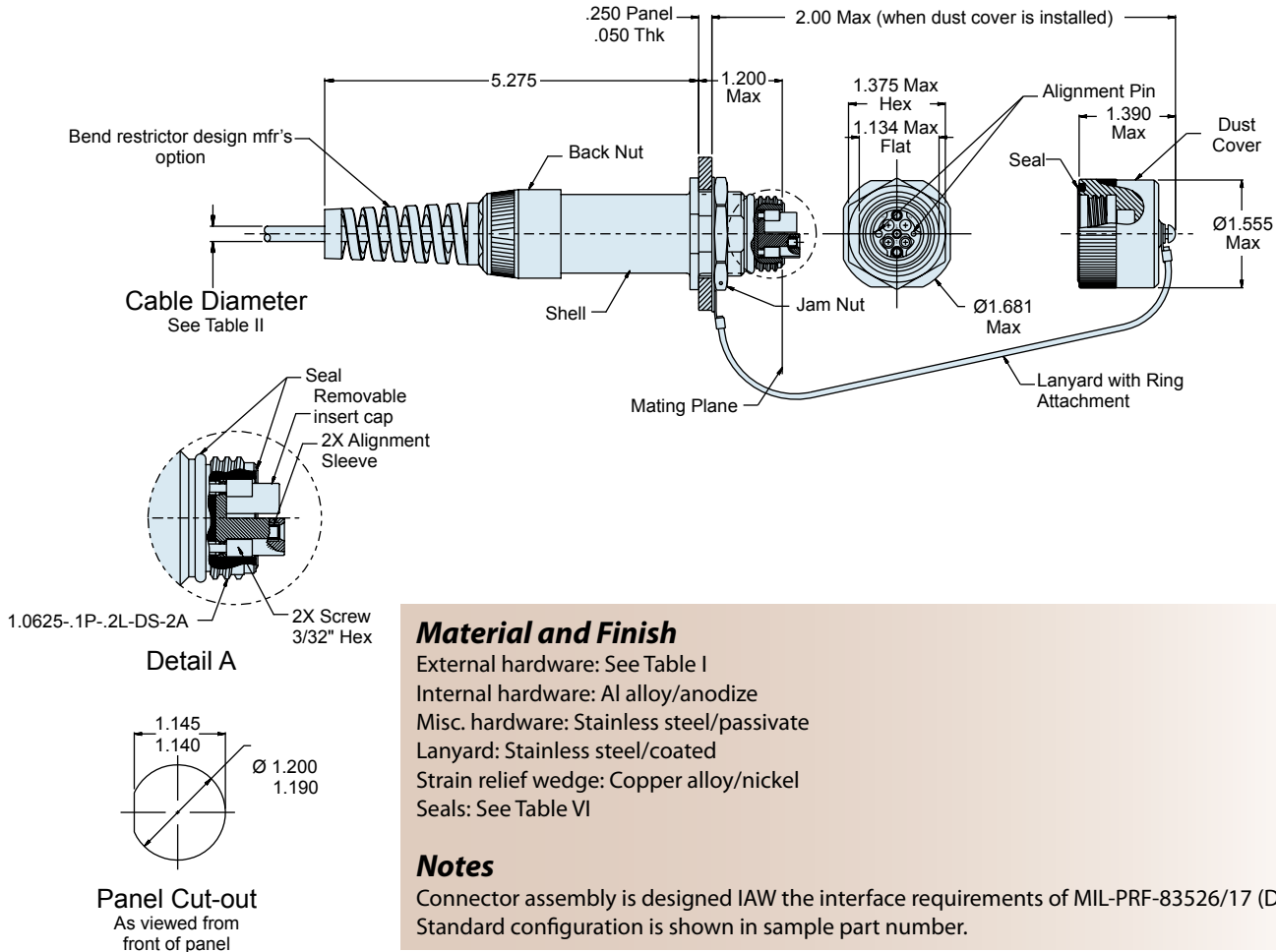
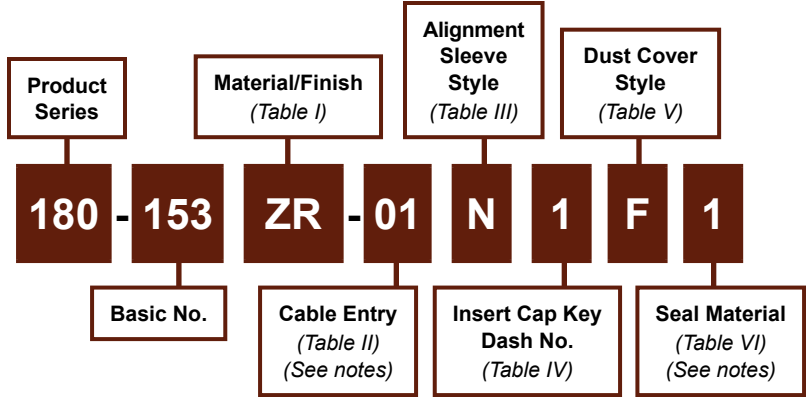


**180-153**  
**GFOCA Internal Mount Jam Nut**  
**Receptacle with Strain Relief**  
**MIL-DTL-83526 Type, 4 Channel**



**MIL-DTL-83526 type hermaphroditic GFOCA internal mount jam nut receptacle with strain relief**

**How To Order**





**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.	<p><b>Key 1</b></p>	<p><b>Key 2</b></p>	<p><b>Key 3</b></p>	<p><b>Key U (universal)</b></p>

**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

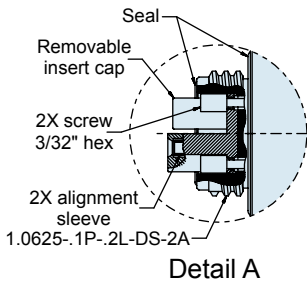
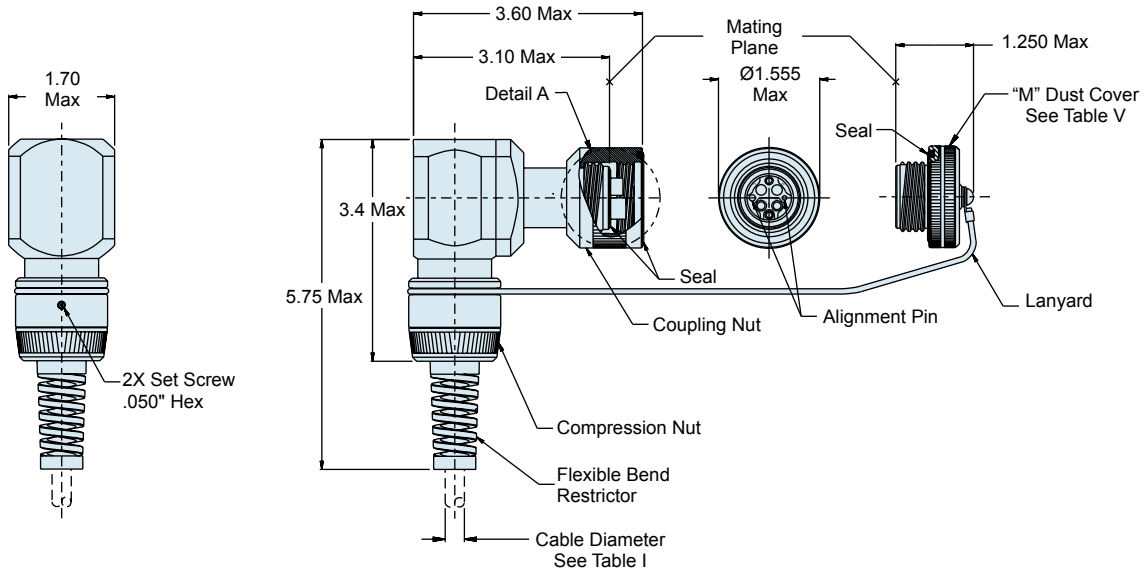
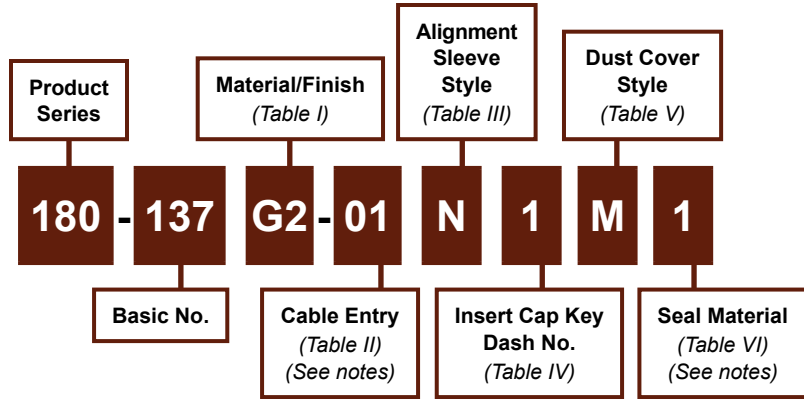


**180-137**  
**GFOCA 90° Hermaphroditic Plug Connector**  
**MIL-DTL-83526 Type, 4 Channel**



**MIL-DTL-83526 type 90 degree hermaphroditic GFOCA plug connector, 4 channel**

**How To Order**



**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.

**180-137**  
**GFOCA 90° Hermaphroditic Plug Connector**  
**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

Dash No.	Cable Diameter	
	Inch	mm
01	.190-.315	4.83-8.00
02	.316-.379	8.03-9.63

Code.	Style
C	Captive Split
N	None

Table IV: Insert Cap Key Configurations				
Dash No:	1	2	3	4
Config.	<p style="text-align: center;"><b>Key 1</b></p>	<p style="text-align: center;"><b>Key 2</b></p>	<p style="text-align: center;"><b>Key 3</b></p>	<p style="text-align: center;"><b>Key U (universal)</b></p>

Table V: Dust Cover Style	
Code.	Style
M	Male
N	None

Table VI: Seal Material	
Dash No.	Seal material(s)
1	Fluorosilicone
2	EPDM

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.



**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.
<b>Fiber Optic Termini</b>		
<b>181-039</b>	M29504/14 Fiber Optic Pin Terminus, Size 16	J-3
<b>181-040</b>	M29504/15 Fiber Optic Socket Terminus, Size 16	J-4
<b>181-051</b>	M29504/3 Fiber Optic Dummy Terminus, Size 16	J-5
<b>Fiber Optic Connectors</b>		
<b>180-040</b>	M28876 Square Flange Wall Mount Receptacle Connector	J-10
<b>180-040</b>	M28876 Jam Nut Mount Receptacle Connector	J-12
<b>180-040</b>	M28876 In-Line Receptacle Connector	J-14
<b>180-040</b>	M28876 Plug Connector	J-14
<b>Panel Gaskets, Backshells, Adapters and Dust Covers</b>		
<b>M28840/24</b>	MIL-Spec Wall Mount Gasket	J-17
<b>930-006</b>	Commercial Wall Mount Gasket	J-17
<b>189-015</b>	Environmental Banding Backshell	J-18
<b>189-001</b>	Fiber Optic Backshell with Split Clamp	J-20
<b>189-007</b>	Fiber-Con Backshell	J-22
<b>189-009</b>	Banding Backshell/Molding Adapter	J-24
<b>189-014</b>	PEEK Convoluted Tubing Backshell	J-26
<b>660-072/073</b>	Dust Covers	J-28

**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°





## 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.	



M29504/14

181-039

Size 16 Fiber Optic Pin Terminus  
For MIL-PRF-28876 Connectors



MIL-PRF-28876  
Connectors



**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.

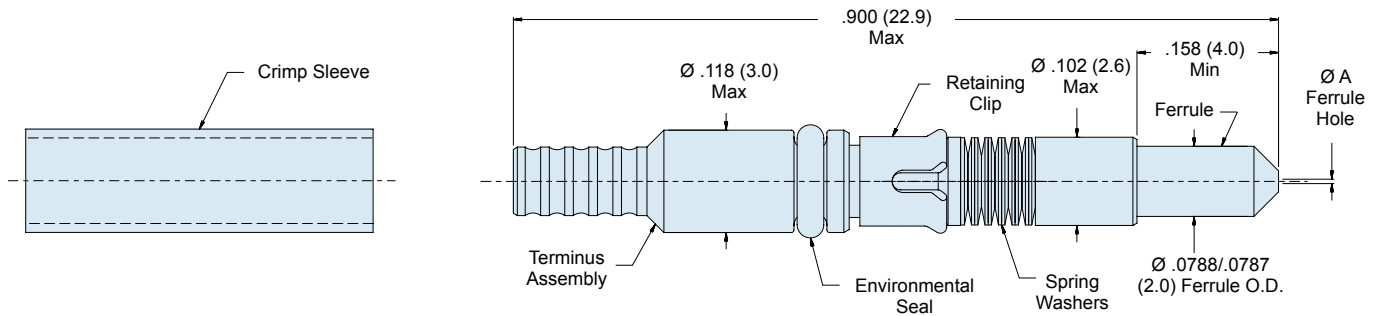


Table II: Tools and Accessories	
Part Number	Description
265-008	Crimp Sleeve Ø2.4mm Max Jacket (Mil-Spec Type)
182-012	Crimp Tool
182-013	Insertion Tool, Straight
182-014	Insertion Tool, 90°
182-015	Removal Tool
182-035	Hand Polishing Tool

**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.



## Size 16 M29504/15 fiber optic socket terminus for MIL-PRF-28876 connectors



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.

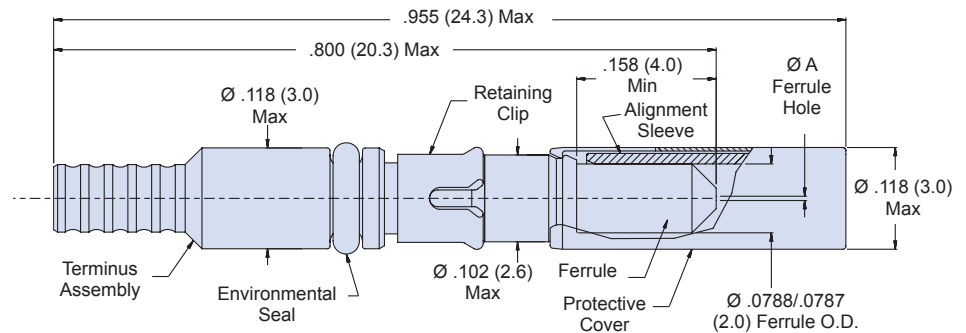
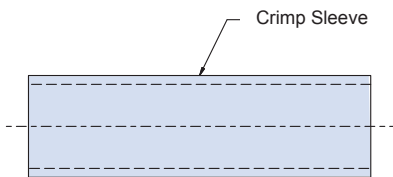


Table II: Tools and Accessories

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. 181-040-1260CN).
- See Glenair GAP-036 for termination procedure and assembly tools.
- Dummy Terminus: Part Number 181-051 or M29504/3-4038.

M29504/3  
181-051  
Size 16 Dummy Terminus  
for MIL-PRF-28876 Connectors

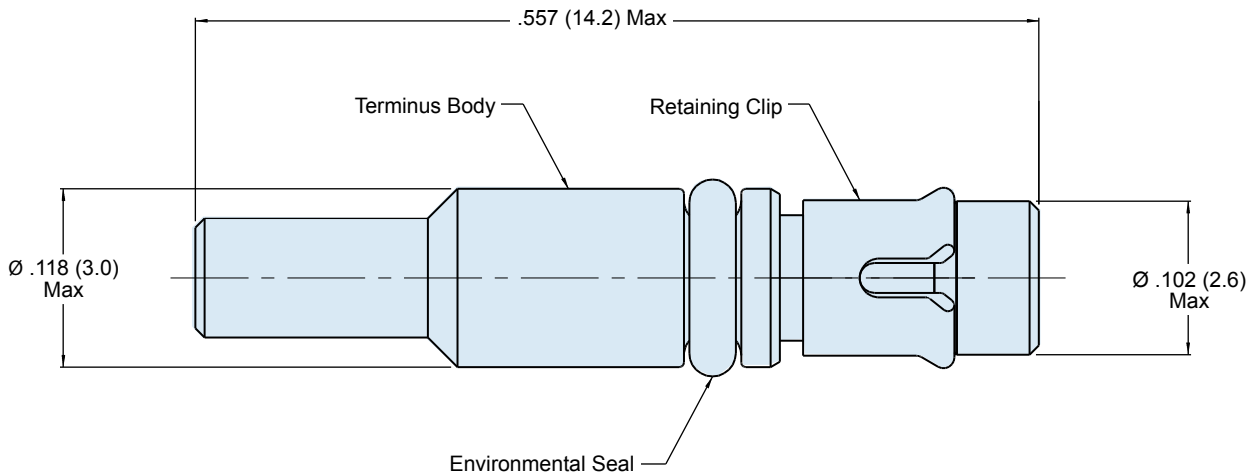


**Size 16 M29504/3 fiber optic dummy terminus for MIL-PRF-28876 connectors**



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.





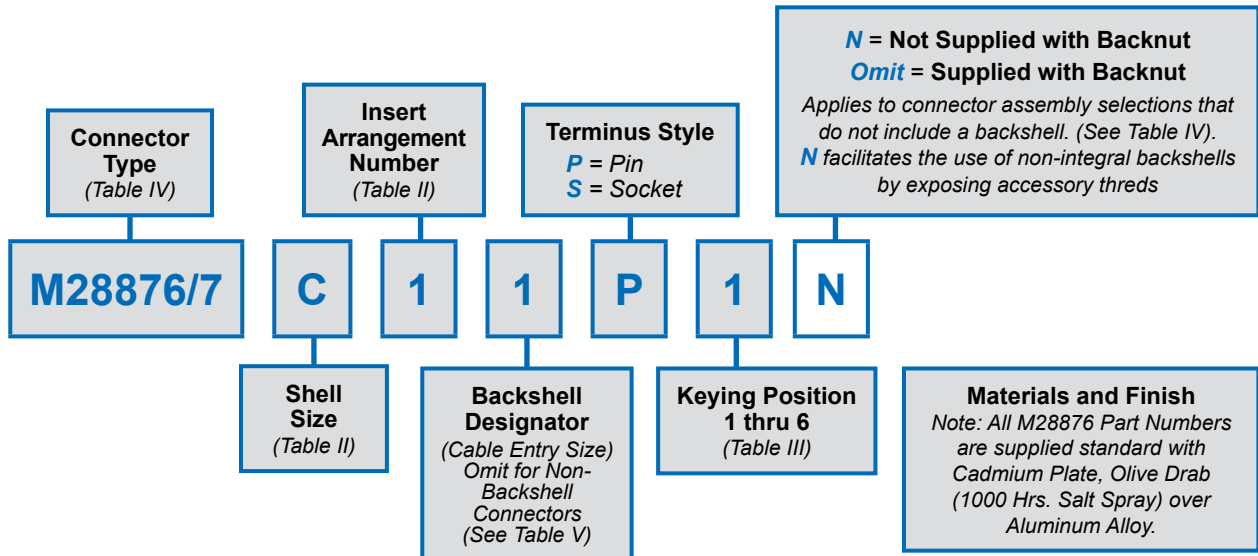
# MIL-PRF-28876 QPL Fiber Optic Connectors

## 180-040

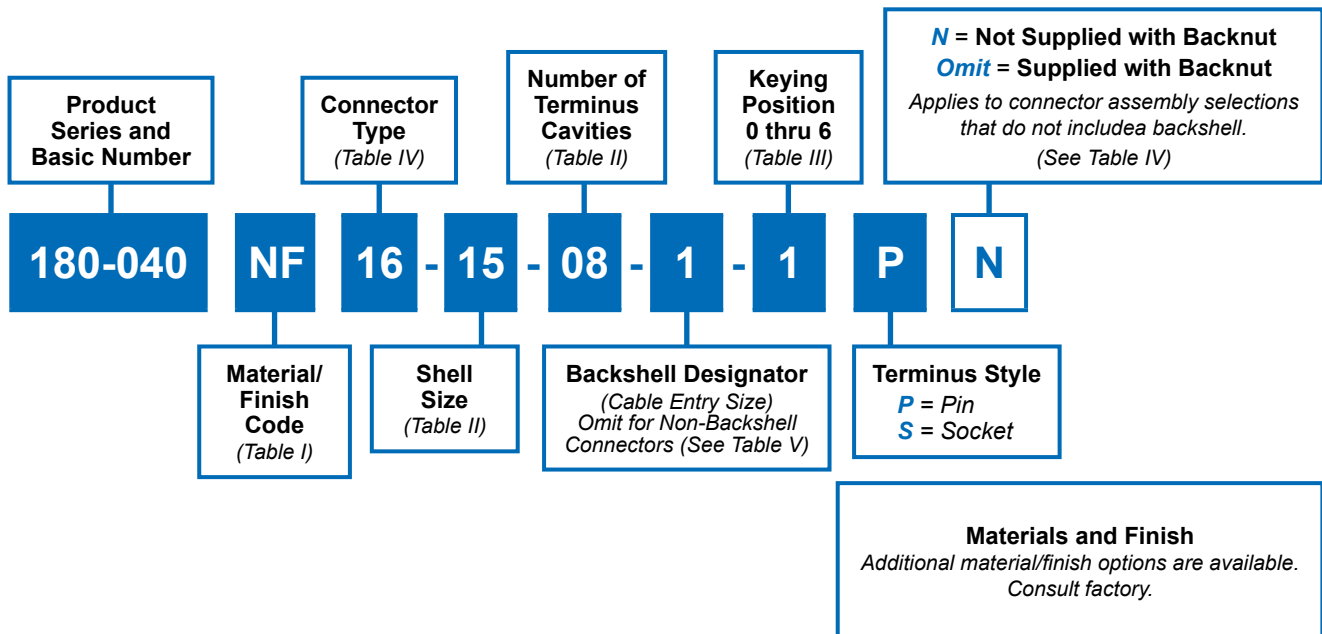
### How to Order



### Military QPL M28876/1 through /14 fiber optic connectors



### Glenair commercial equivalent MIL-PRF-28876 type fiber optic connectors



# MIL-PRF-28876 QPL Fiber Optic Connectors

## 180-040

### How to Order



Code	Material	Finish Description
<b>M</b>	Aluminum Alloy	Electroless Nickel
<b>NF</b>		Cadmium, Olive Drab
<b>MT*</b>		Nickel-PTFE, Grey
<b>ZR</b>		Zinc-Nickel, Black

Refer to Appendix for material/finish details

Mil-Spec		Commercial	
Shell Size	Insert Arrangement	Shell Size	Number of Cavities
<b>A</b>	<b>1</b>	<b>11</b>	<b>02</b>
<b>B</b>	<b>1</b>	<b>13</b>	<b>04</b>
<b>C</b>	<b>2</b>	<b>15</b>	<b>06</b>
	<b>1</b>		<b>08</b>
<b>F</b>	<b>2</b>	<b>23</b>	<b>18</b>
	<b>1</b>		<b>31</b>

Consult factory for QPL status

Backshell Designator	Max Allowable Cable Diameter by Shell Size			
	A (11)	B (13)	C (15)	F (23)
<b>1</b>	.250 (6.4)	.285 (7.2)	.500 (12.7)	.866 (22.0)
<b>2</b>	.346 (8.8)	.346 (8.8)	.250 (6.4)	1.000 (25.4)
<b>3</b>		.453 (11.5)	.375 (9.5)	.600 (15.2)

Connector Type	Backshell Type	MIL-Spec	Commercial
Wall Mount Receptacle	None	M28876/1	<b>03</b>
	Straight	M28876/2	<b>13</b>
	45°	M28876/3	<b>23</b>
	90°	M28876/4	<b>33</b>
In-Line Receptacle	Straight	M28876/5	<b>15</b>
Plug	None	M28876/6	<b>06</b>
	Straight	M28876/7	<b>16</b>
	45°	M28876/8	<b>26</b>
	90°	M28876/9	<b>36</b>
Jam Nut Receptacle	None	M28876/11	<b>04</b>
	Straight	M28876/12	<b>14</b>
	45°	M28876/13	<b>24</b>
	90°	M28876/14	<b>34</b>

### 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

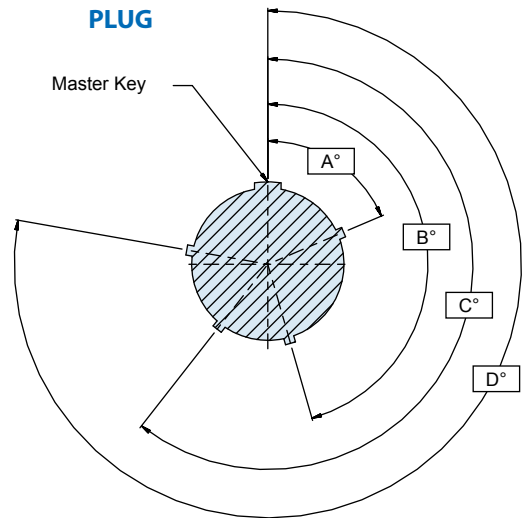
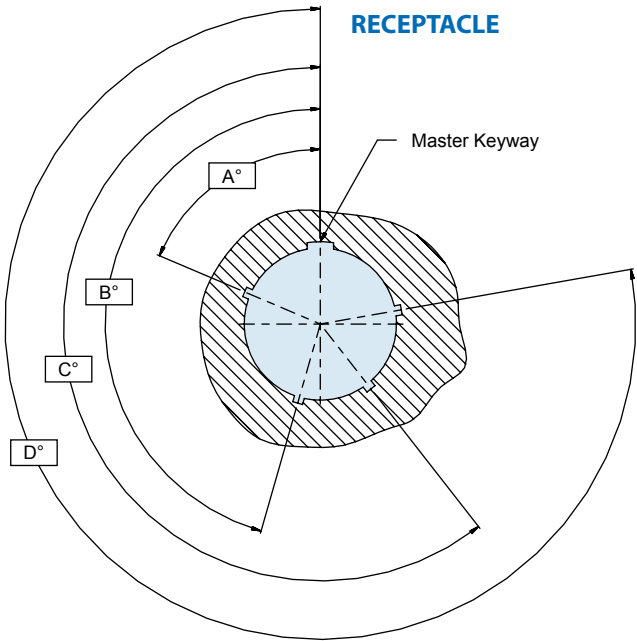
- Termini (Not Supplied with Connector):
- M29504/14 - Pin terminus, MIL-Spec
- M29504/15 - Socket Terminus, MIL-Spec
- M29504/3 - Dummy Terminus, MIL-Spec
- 181-039 - Pin Terminus, MIL-Spec Style
- 181-040 - Socket terminus, MIL-Spec Style
- 181-051 - Dummy Terminus MIL-Spec Style
- Backnut retained 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.





**Key Positions for MIL-PRF-28876 (180-040) fiber optic connectors**



**Table III: Keying Position**

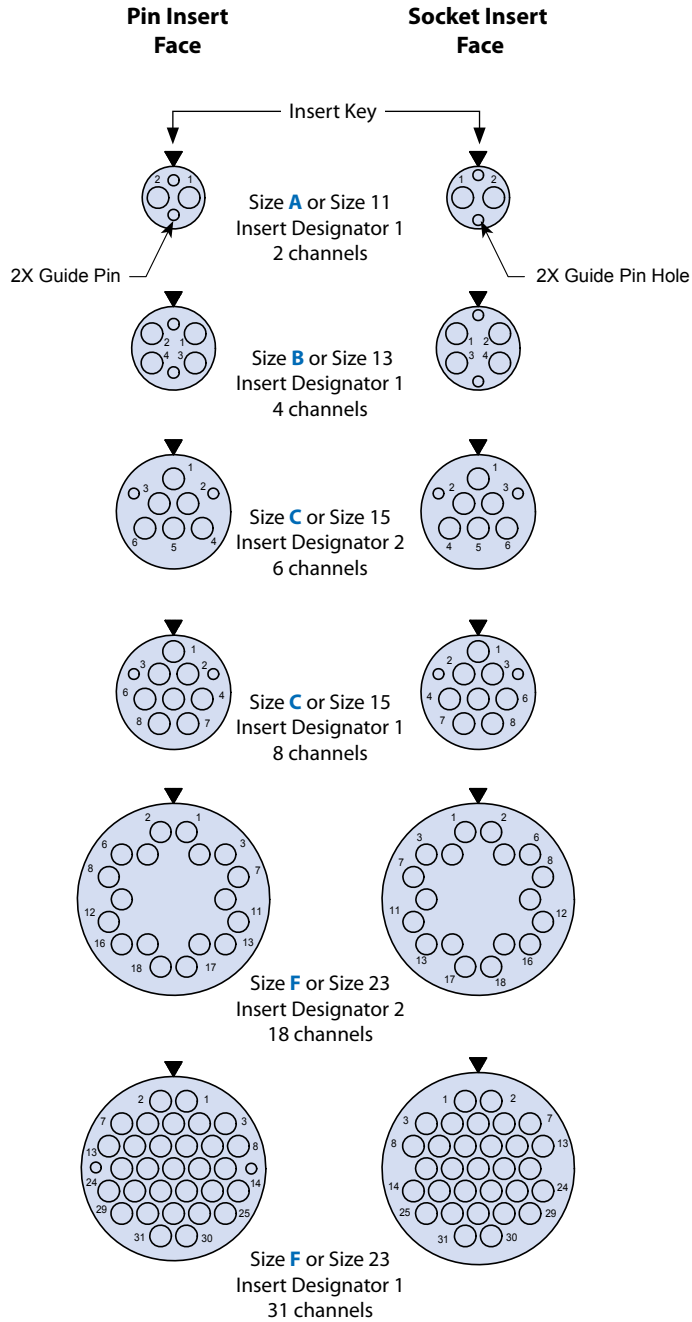
Shell Size	Key Position	A°	B°	C°	D°
11 and 13	0*	-	-	-	-
	1	95	141	208	236
	2	113	156	182	292
	3	90	145	195	252
	4	53	156	220	255
	5	119	146	176	298
	6	51	141	184	242
15 and 23	0*	-	-	-	-
	1	80	142	196	293
	2	135	170	200	310
	3	49	169	200	244
	4	66	140	200	257
	5	62	145	180	280
	6	79	153	197	272

\*0 indicates universal keying arrangement and is available on commercial equivalent plug connector only.





**Insert arrangements for MIL-PRF-28876 (180-040) fiber optic connectors**





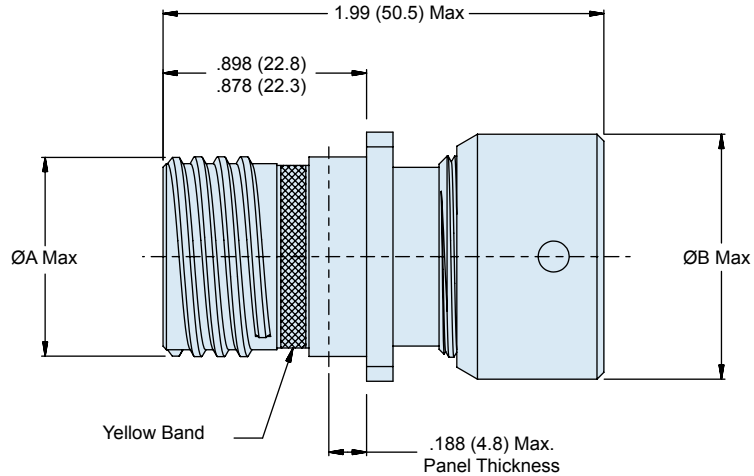
M28876 (/1, /2, /3, /4)  
180-040 (-03, -13, -23, -33)  
MIL-PRF-28876 Wall Mount Receptacle Connector  
for use with MIL-PRF-29504/14 and /15 Termini



**MIL-PRF-28876 QPL wall mount receptacle connector**

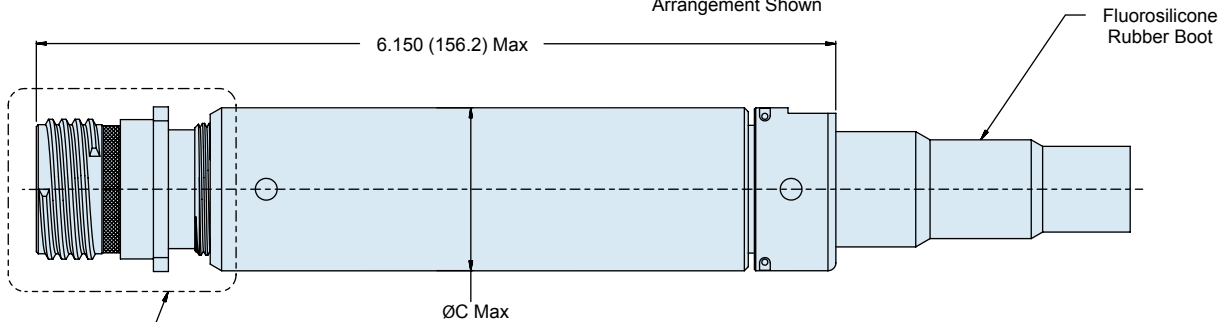
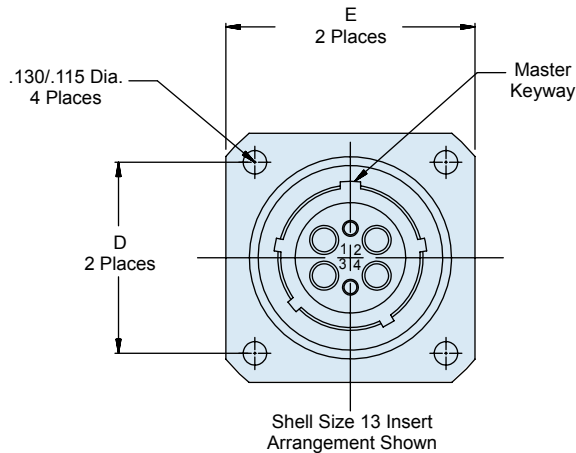


Receptacle without backshell



Receptacle with straight backshell

**M28876/1 • 180-040(-03)  
WALL MOUNT RECEPTACLE WITHOUT**



All Dimensions  
Per M28876/1

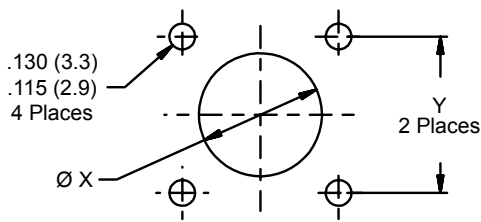
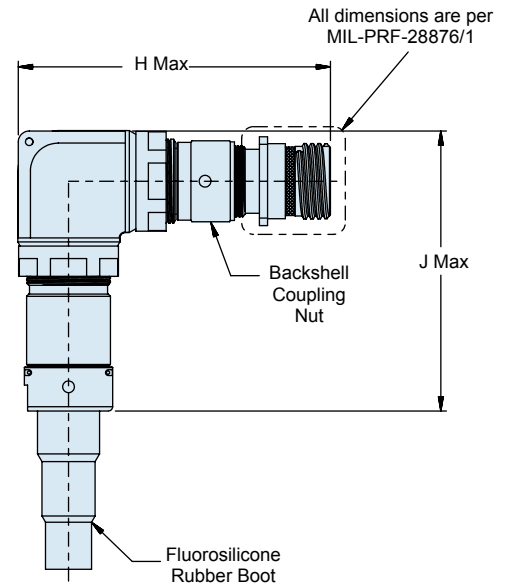
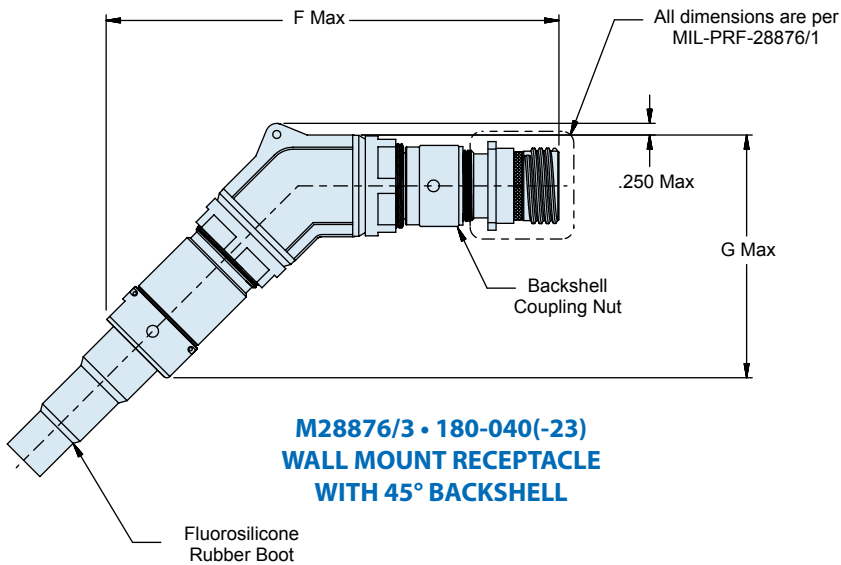
**M28876/2 • 180-040(-13)  
WALL MOUNT RECEPTACLE WITH  
STRAIGHT BACKSHELL**

J

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



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)



Recommended Panel Cutout  
(Wall Mounting)

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)





180-040 (-04, -14, -24, -34)  
MIL-PRF-28876 Jam Nut Mount Receptacle Connector  
for use with MIL-PRF-29504/14 and /15 Termini

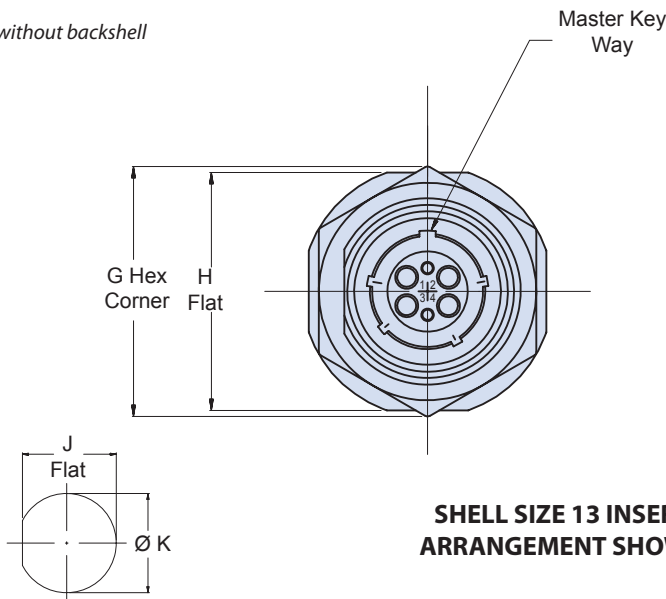
M28876

MIL-PRF-28876 QPL jam nut receptacle connector

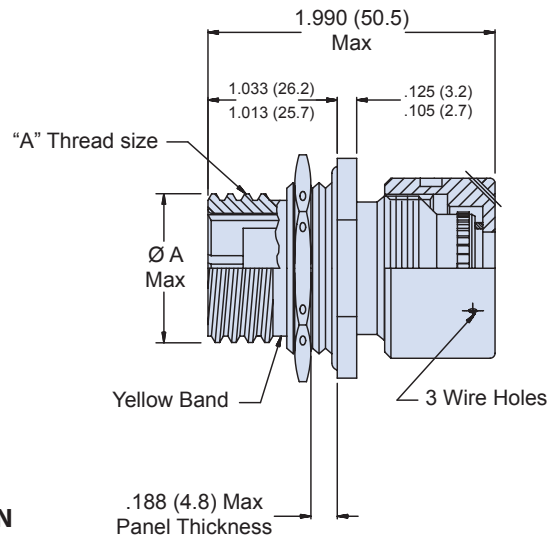


Table I							
Shell Size	G Max	H ± .010 (0.3)	J ± .005 (0.1)	Ø K ± .005 (0.1)	Ø C Max	Ø L Max	Ø A Max
11	1.290 (32.8)	1.264 (32.1)	.848 (21.5)	.885 (22.5)	.960 (24.4)	.960 (24.4)	.750 (19.1)
13	1.435 (35.9)	1.389 (35.3)	.973 (24.7)	1.010 (25.7)	1.085 (27.6)	1.085 (27.6)	.875 (22.2)
15	1.650 (41.9)	1.577 (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)

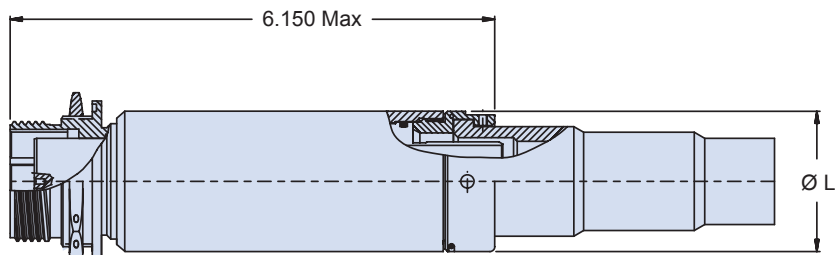
Receptacle without backshell



Recommended Panel Cutout  
(Jam Nut Mounting)  
As Viewed from Face of Panel



04 - JAM NUT MOUNT RECEPTACLE  
WITHOUT BACKSHELL  
M28876/11 • 180-040 (-04)

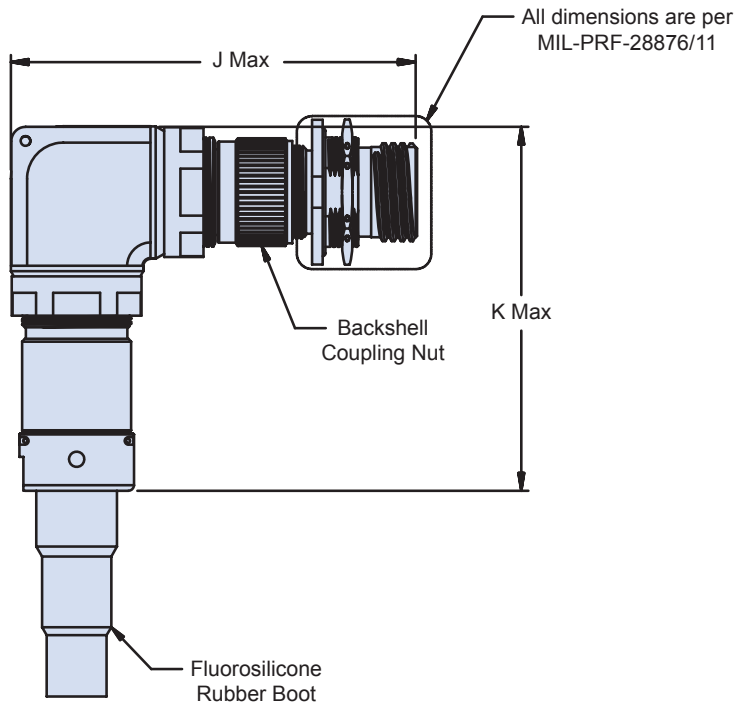


M28876/12 • 180-040 (-14) JAM NUT MOUNT RECEPTACLE  
WITH STRAIGHT BACKSHELL

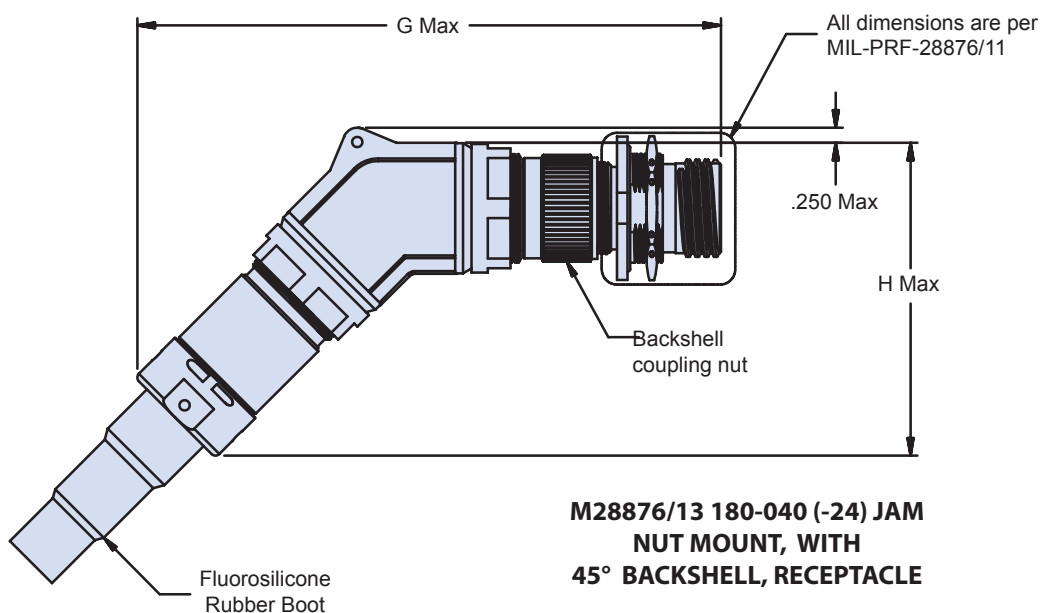
180-040 (-04, -14, -24, -34)  
**MIL-PRF-28876 Jam Nut Mount Receptacle Connector**  
 for use with MIL-PRF-29504/14 and /15 Termini



MIL-PRF-28876  
 Connectors



**M28876/14 180-040 (-34) JAM NUT MOUNT, WITH 90° BACKSHELL, RECEPTACLE**



**M28876/13 180-040 (-24) JAM NUT MOUNT, WITH 45° BACKSHELL, RECEPTACLE**

J



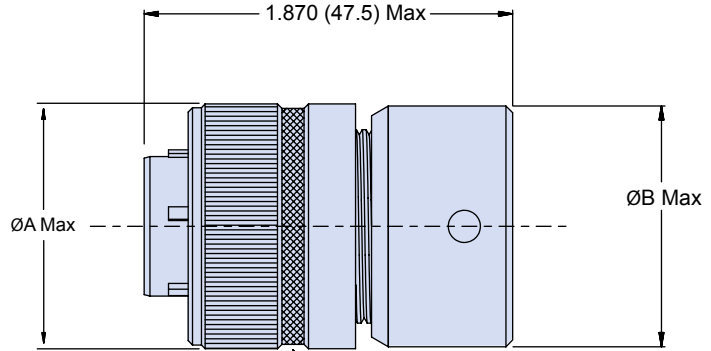
M28876 (/6, /7, /8, /9)  
180-040 (-06, -16, -26, -36)  
MIL-PRF-28876 Plug Connector  
for use with MIL-PRF-29504/14 and /15 Termini



**MIL-PRF-28876 QPL plug connector**



Plug without backshell

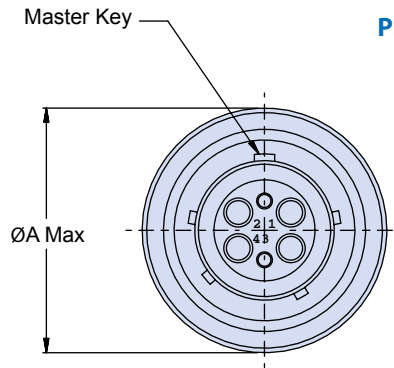


Yellow Band

**M28876/6 • 180-040 (-06)  
PLUG WITHOUT BACKSHELL**

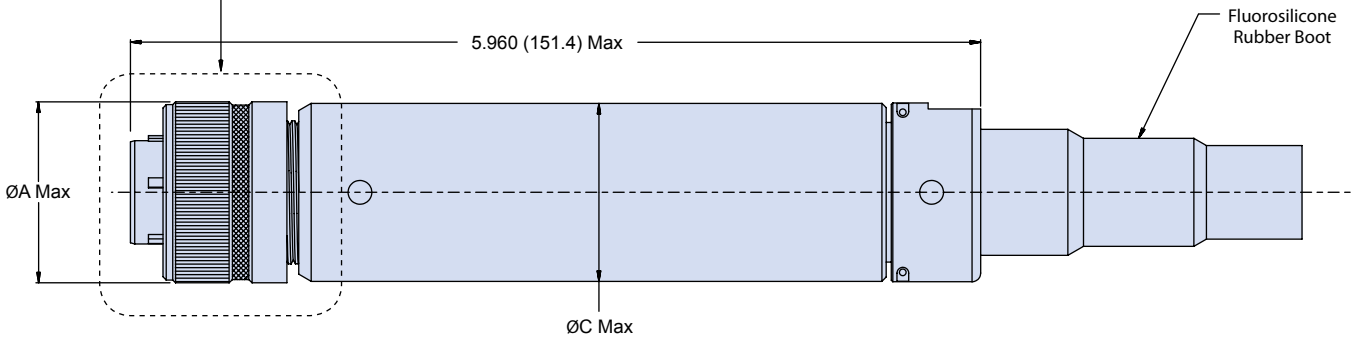


Plug with straight backshell



Shell Size 13 Insert  
Arrangement Shown

All dimensions are  
per M28876/6



Fluorosilicone  
Rubber Boot

**M28876/7 • 180-040 (-16) PLUG WITH STRAIGHT BACKSHELL**

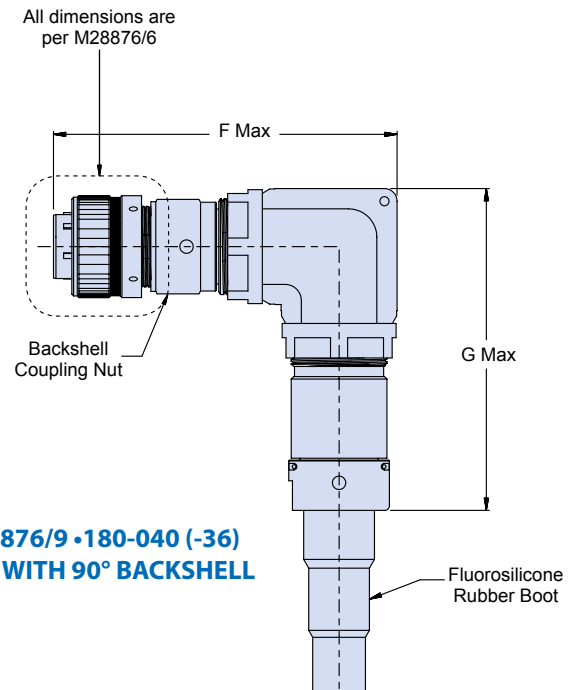
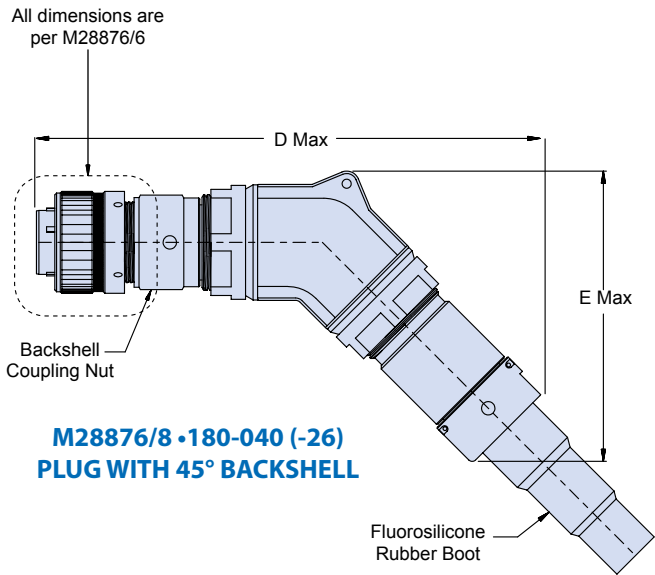
J



M28876 (16, 17, 18, 19)  
 180-040 (-06, -16, -26, -36)  
 MIL-PRF-28876 Plug Connector  
 for use with MIL-PRF-29504/14 and /15 Termini



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)



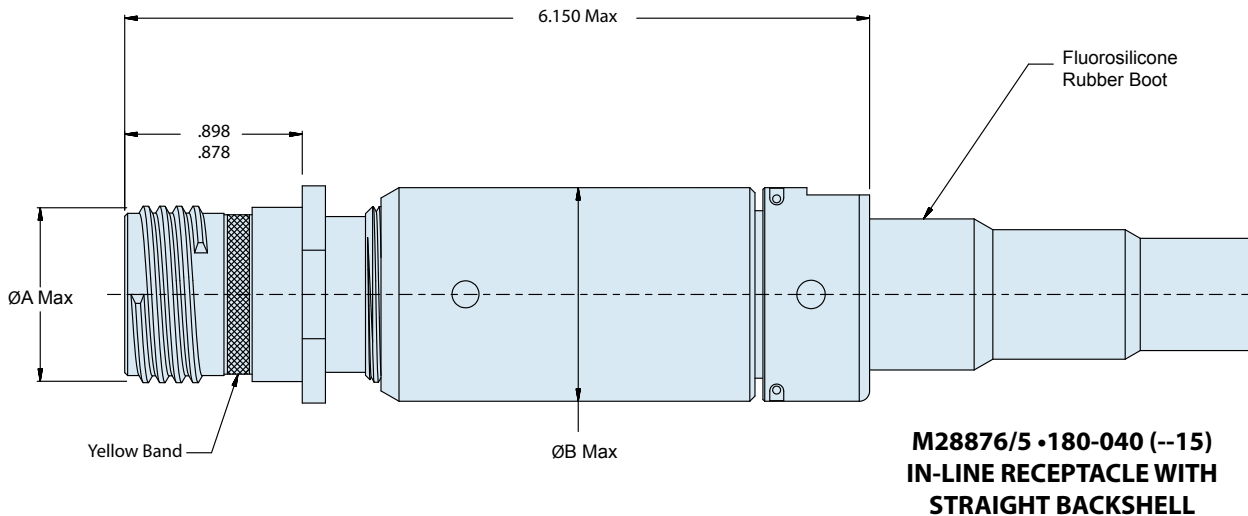
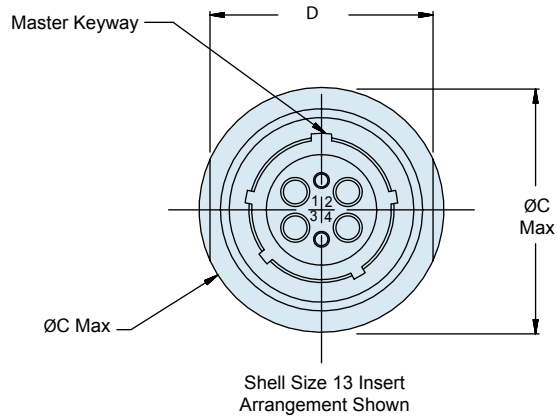


**M28876/5**  
**In-Line Receptacle**  
for use with MIL-PRF-29504/14 and /15 Termini



**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)

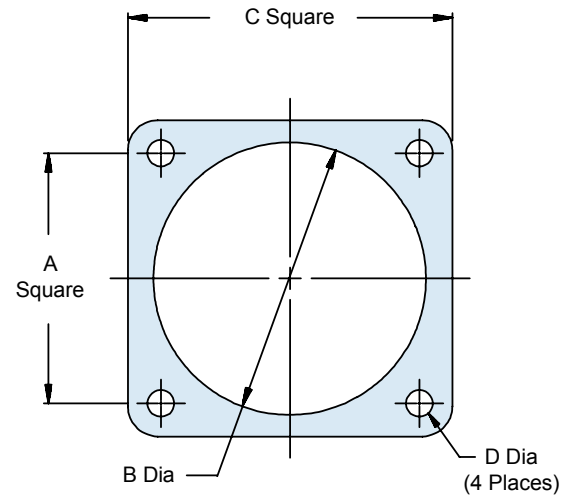
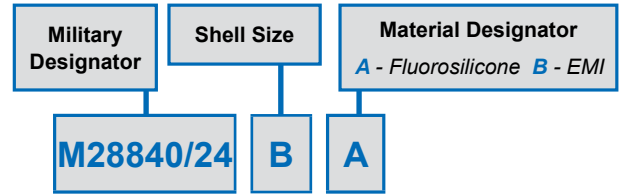


**M28840 /24 and 930-006**  
**Square Flange Wall Mount Receptacle Panel Gaskets**  
 for use with MIL-PRF-28876 (1, 2, 3, 4)  
 and 180-040 (-03, -13, -23, -33) Commercial Connectors



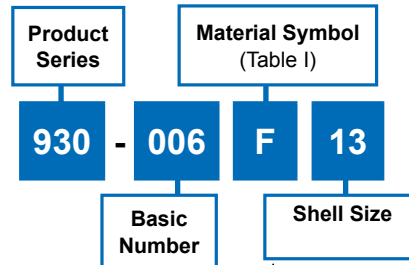
**MIL-PRF square flange wall mount receptacle panel gasket**

Shell Size	A	B Dia.	C	D Dia.
A (11)	.760 (19.30)	.766 (19.46)	1.039 (26.39)	.130 (3.30) .110 (2.79)
	.740 (18.80)	.750 (19.05)	1.023 (25.98)	
B (13)	.853 (21.67)	.891 (22.63)	1.154 (29.31)	
	.833 (21.16)	.875 (22.22)	1.138 (28.90)	
C (15)	.978 (24.84)	1.078 (27.38)	1.274 (32.36)	
	.958 (24.33)	1.062 (26.97)	1.258 (31.95)	
F (23)	1.291 (32.79)	1.516 (38.51)	1.734 (44.04)	
	1.271 (32.28)	1.500 (38.10)	1.718 (43.64)	

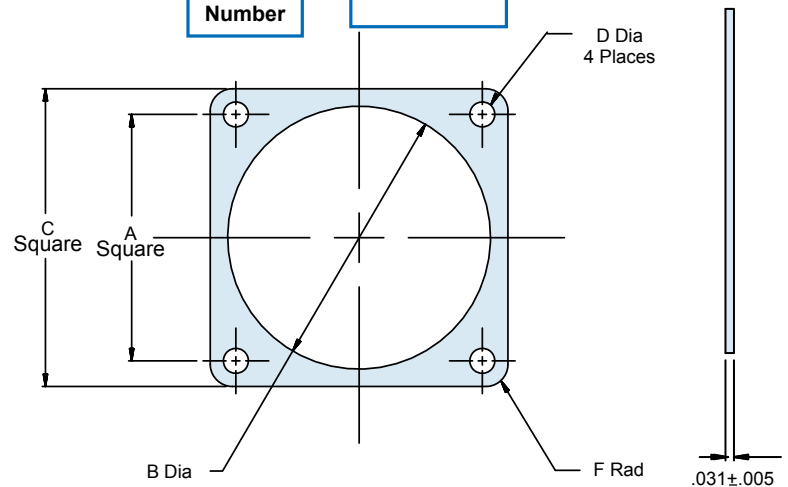


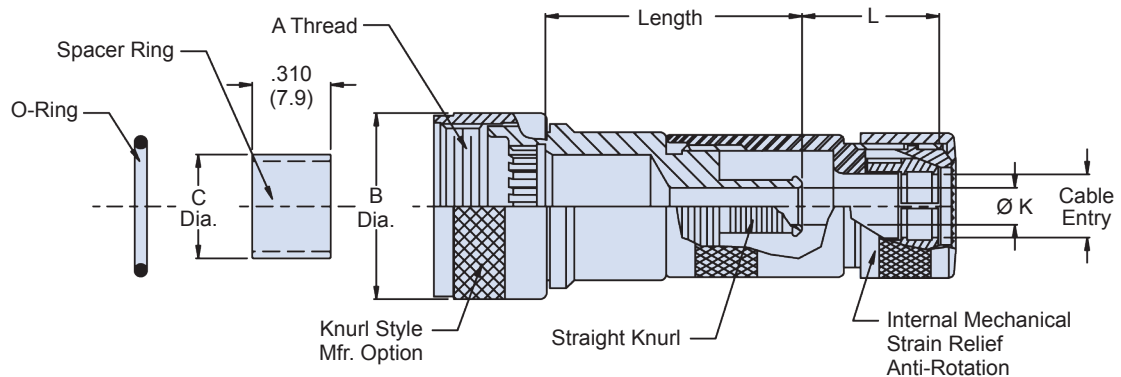
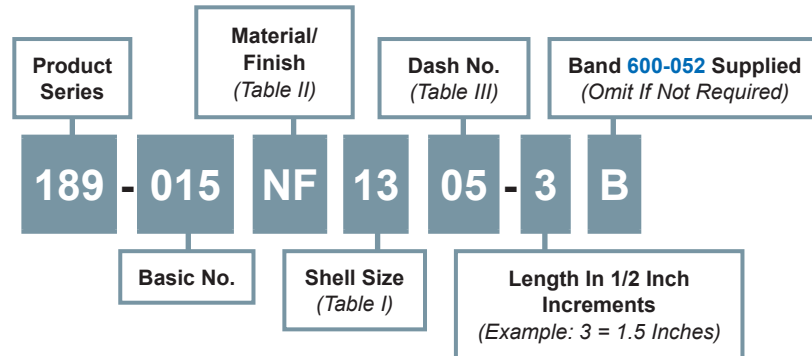
**Commercial equivalent square flange wall mount receptacle panel gasket**

Symbol	Material Description
F	Fluorosilicone
M	Silver Plated Glass Filled Silicone (EMI)
N	Neoprene



Shell Size	A ± .010	Ø B +.016 -0.000	C +.016 -0.000	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



**MIL-PRF-28876 and 189-015 banding backshell**
**How To Order**

**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**

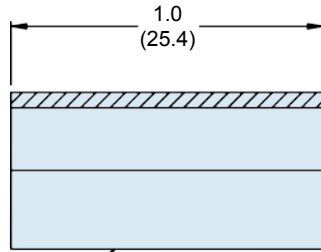
Glenair 600 Series Backshell assembly tools are recommended for assembly and installation. Standard minimum length: 1.5 inches, for shorter length consult factory.  
 Spacer Ring and O-Ring are packaged loose and must be installed with Connector at time of assembly. The spacer is utilized to retain the 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

189-015

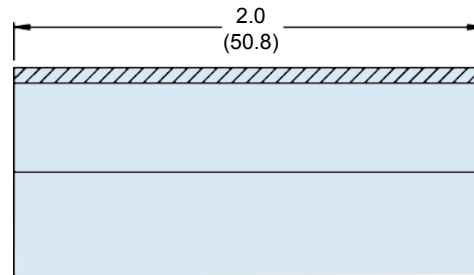
**Environmental Banding Backshell**  
for Multichannel M85045 Shipboard Fiber Optic Cable  
for Use with MIL-PRF-28876 or Glenair 180-040 Connectors



MIL-PRF-28876  
Connectors



Shrink Sleeving  
MIL-I-23053/4



Shrink Sleeving  
MIL-I-23053/5

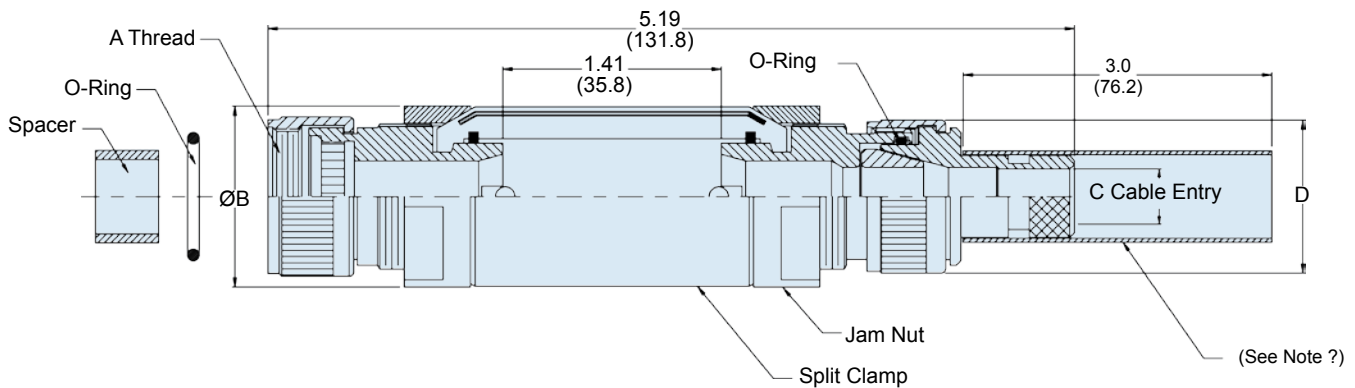
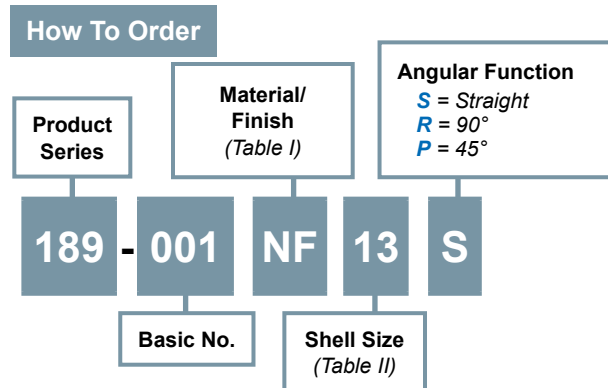
Shell Size	Designator (Ref)	A Thread Class 2B	B Max	C Max	Max Dash Number
11	A	3/4 -20 UNEF	1.028 (26.1)	.410 (10.4)	05
13	B	7/8 -20 UNEF	1.141 (29.0)	.532 (13.5)	05
15	C	1 -20 UNEF	1.263 (32.1)	.710 (18.0)	07
23	F	1-7/16 -18 UNEF	1.703 (43.3)	1.116 (28.3)	13

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

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)



**MIL-PRF-28876 fiber optic backshell**

**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.



189-001  
 Fiber Optic Backshell With Split Clamp  
 MIL-PRF-28876 Environmental

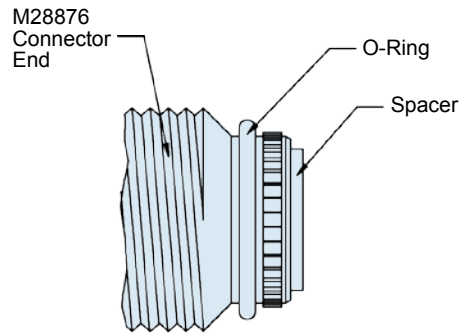
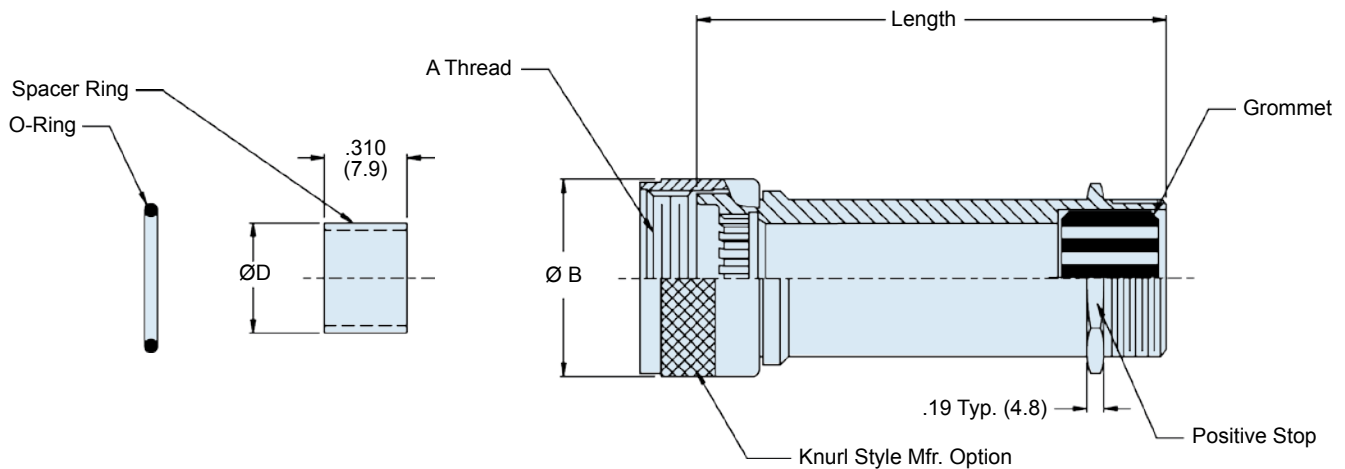
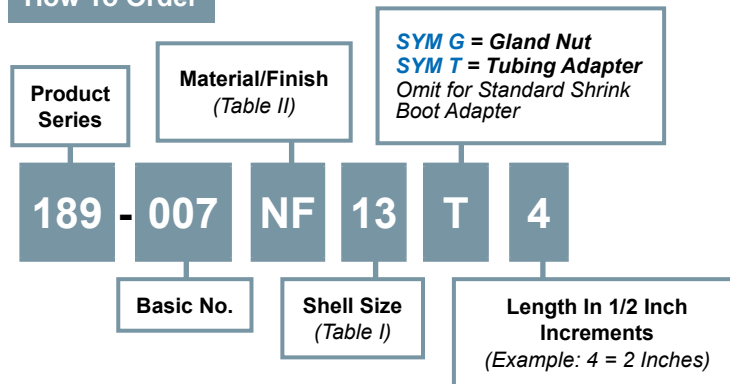


Table I: Material and Finish		
Code	Material	Finish Description
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab Over Electroless Nickel (500 hour salt spray)

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)



**MIL-PRF-28876 fiber-con backshell**
**How To Order**

**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.

189-007  
**Fiber-Con Backshell**  
 for MIL-PRF-28876 Connectors

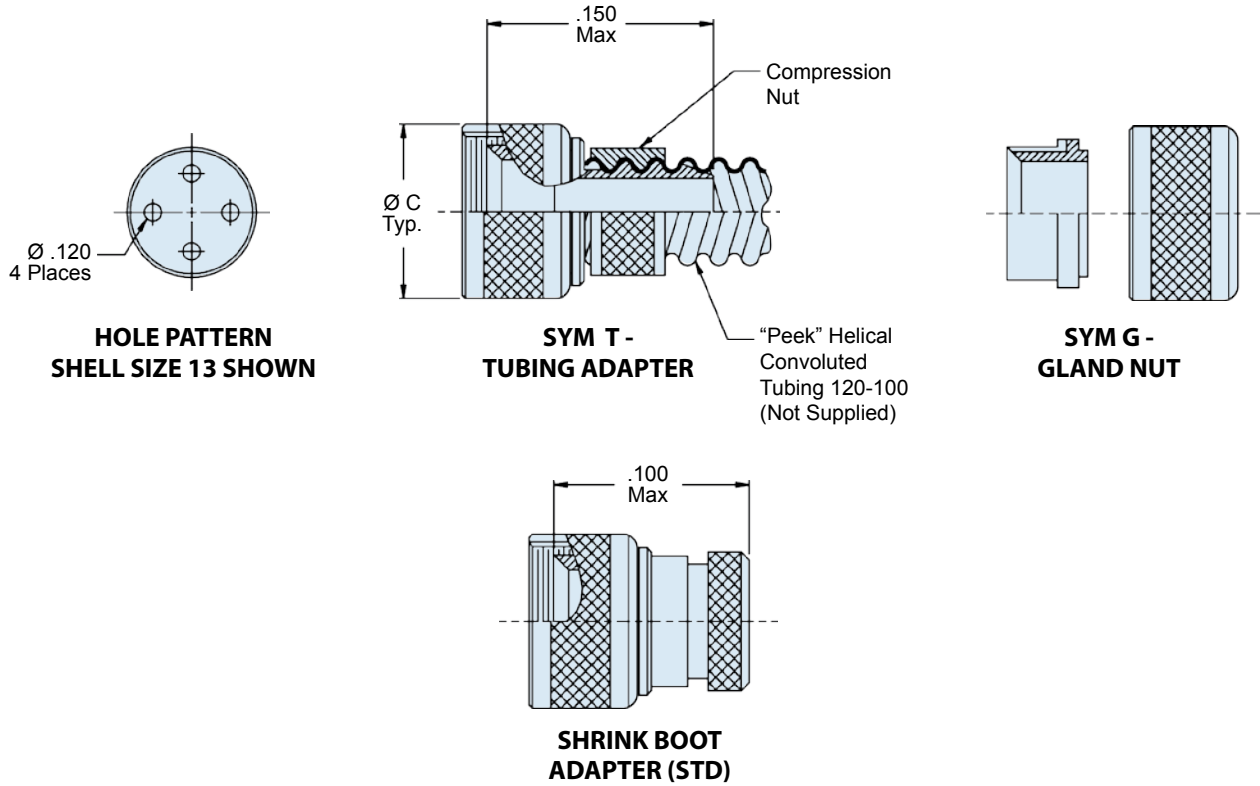


Table I

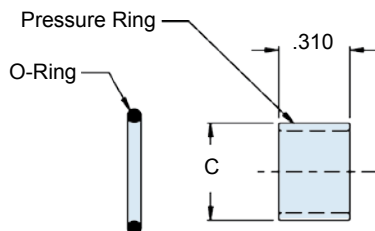
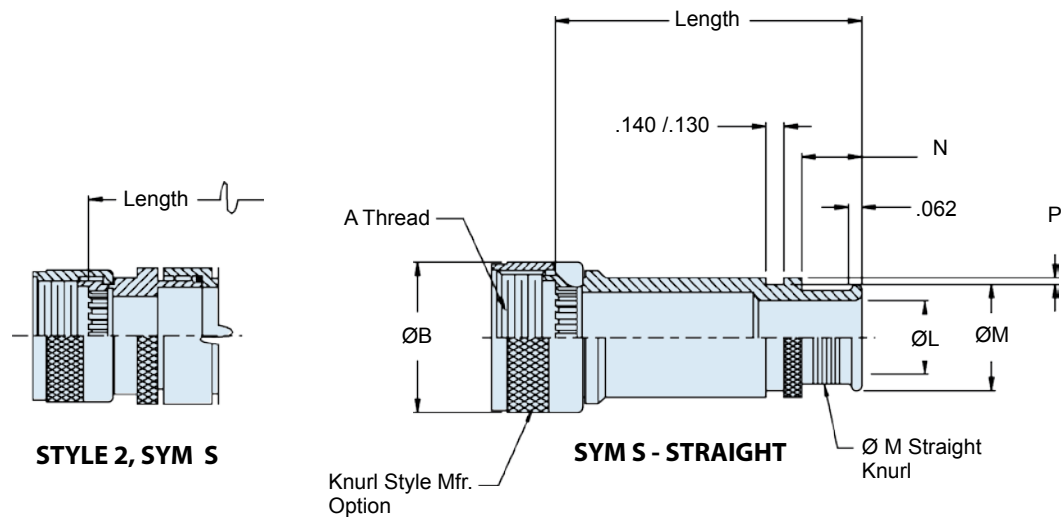
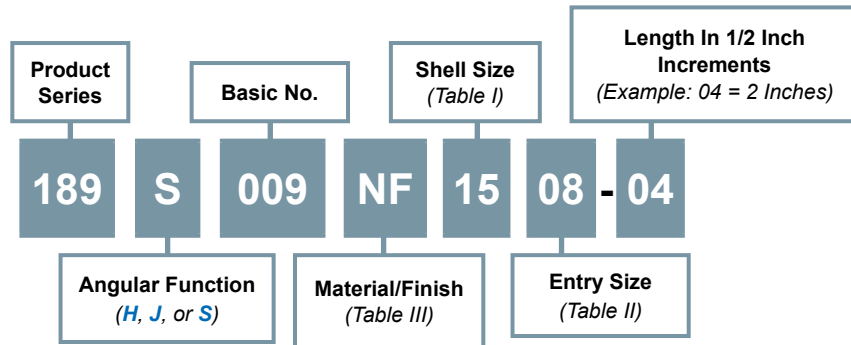
Shell Size	Designator (Ref)	A Thread Class 2B	B Max	C Max	D Max	Conduit Size	No. Of Holes
11	A	3/4-20 UNEF	1.03 (26.2)	-	.41 (10.4)	12	2
13	B	7/8-20 UNEF	1.14 (29.0)	1.12 (28.4)	.53 (13.5)	16	4
15	C	1-20 UNEF	1.26 (32.0)	1.34 (34.0)	.71 (19.0)	24	8
23	F	17/16-18 UNEF	1.70 (43.2)	1.66 (42.2)	1.12 (28.4)	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



**MIL-PRF-28876 banding backshell/molding adapter**
**How To Order**

**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.

189-009  
**Banding Backshell / Molding Adapter**  
 For MIL-PRF-28876 Connectors

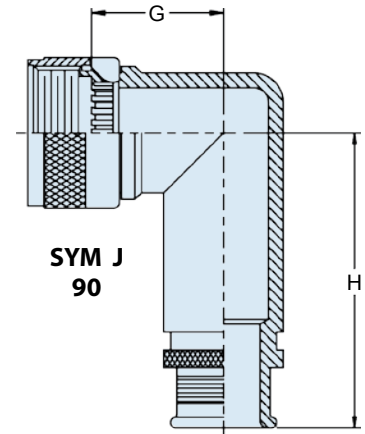
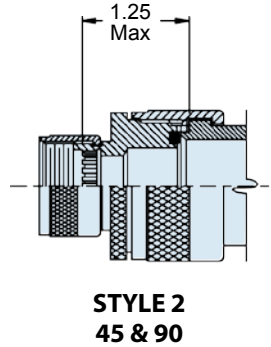
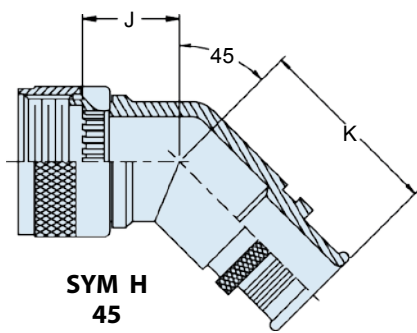


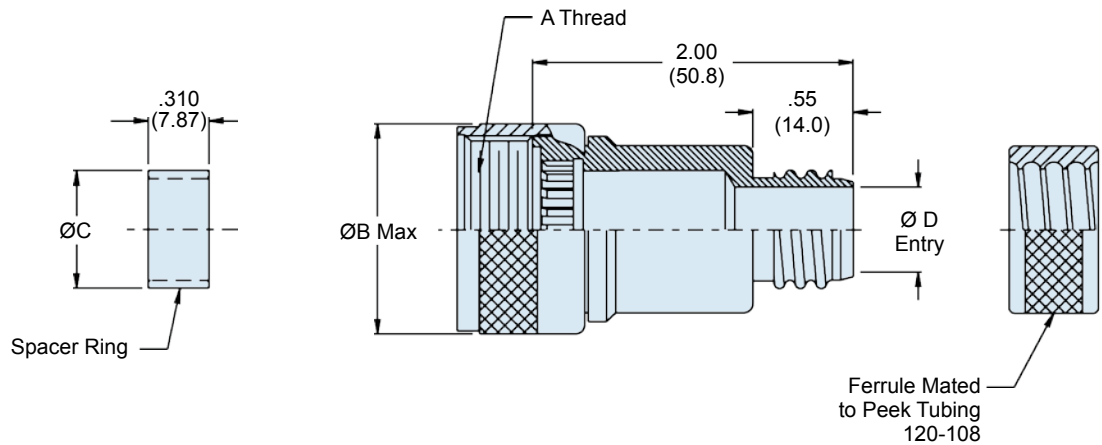
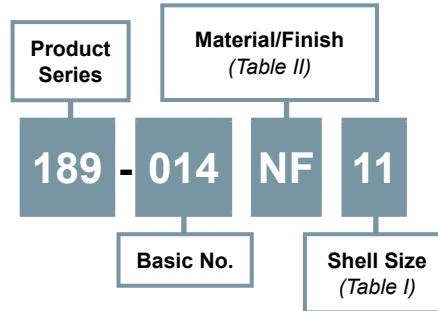
Table I									
Shell Size	Conn. Desig.	A Thread UNEF	ØB Max	ØC Max	G Max	H Max	J Max	K Max	Max Entry
11	A	.750-20	.960 (26.2)	.410 (10.4)	1.28 (32.5)	1.33 (33.8)	1.14 (29.0)	1.19 (30.2)	07
13	B	.875-20	1.09 (29.0)	.532 (13.5)	1.35 (34.3)	1.40 (35.6)	1.17 (29.7)	1.22 (30.1)	08
15	C	1.000-20	1.26 (32.0)	.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



**MIL-PRF-28876 backshell**
**How To Order**

**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.

**189-014**  
**Backshell for PEEK Convolved Tubing**  
to be used with MIL-PRF-28876 Fiber Optic Connectors



**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



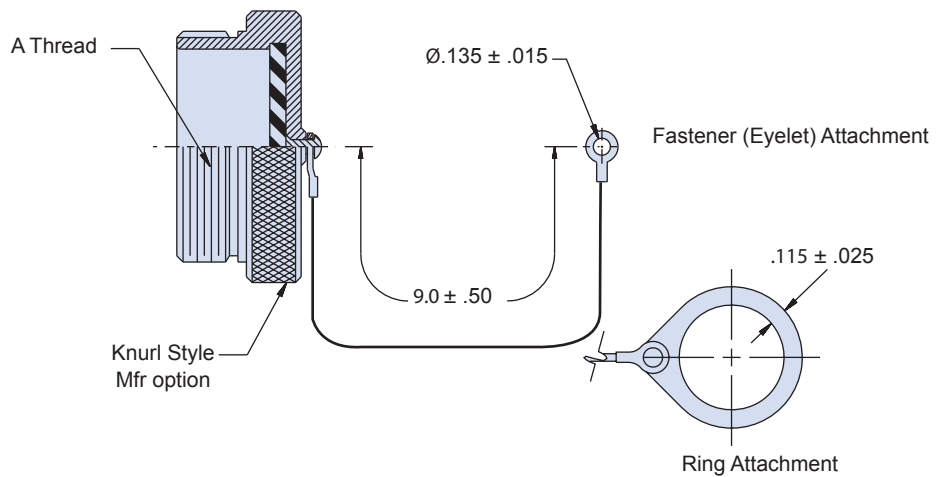




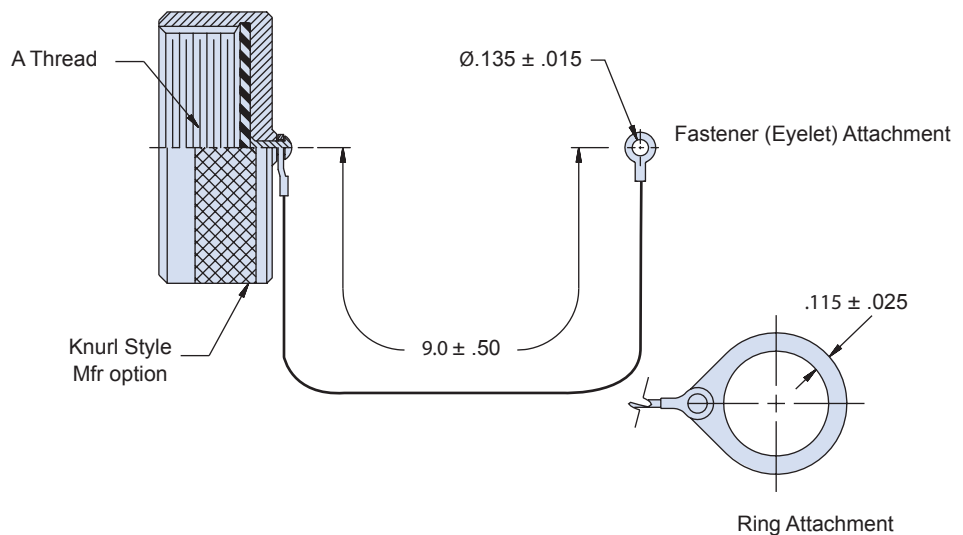
**Plug and receptacle dust covers**

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**

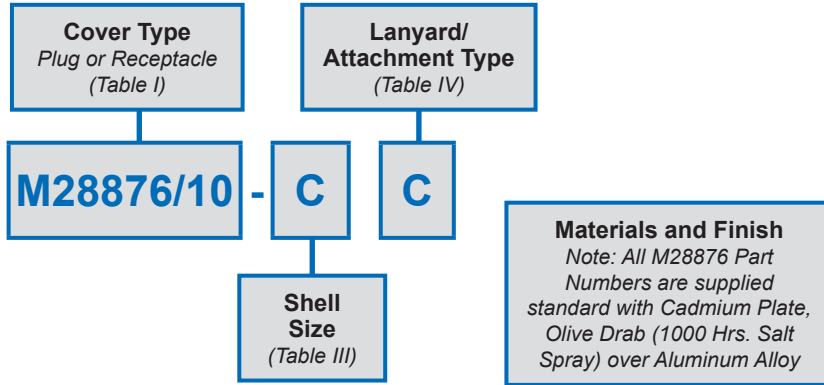


J

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		

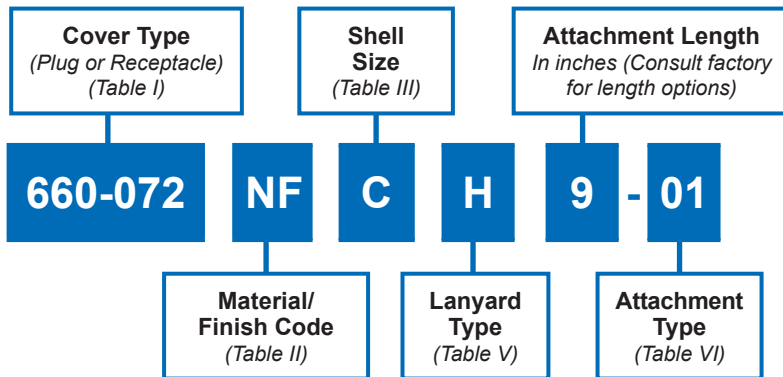
Refer to Appendix for material/finish details

\*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	<b>13</b>
		Recp	<b>15</b>
B	Ring	Plug	<b>15</b>
		Recp	<b>17</b>
C	Ring	Plug	<b>17</b>
		Recp	<b>20</b>
F	Ring	Plug	<b>23</b>
		Recp	<b>27</b>
All	Fastener (Eyelet)	All	<b>01</b>

**Table V: Lanyard Type (Commercial)**

Symbol	Type
H	Wire Rope, Coated
S	Chain (Sash), Passivated
N	No Lanyard
Consult Factory for Additional Options	

**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***

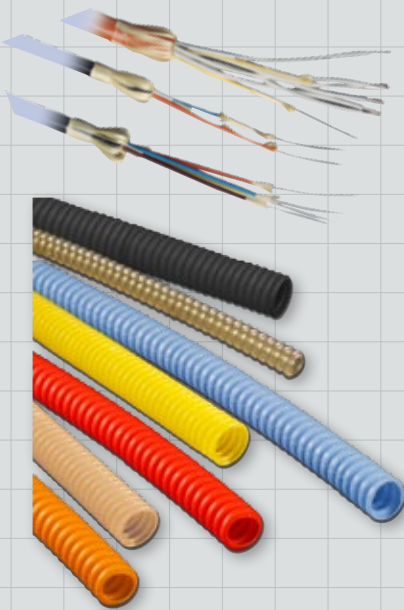
Flexible, high-temperature convoluted tubing is an ideal material choice for the protection of fiber media. The material provides a durable, highly-flexible enclosure for fiber optic systems, with end-fittings and transitions to meet any installation configuration.



## 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.
<b>Bulk Extruded Fiber Optic Cable</b>		
<b>ABC 3586</b>	Bulk Simplex Fiber Optic Cable, 9.3/125 Singlemode Stepped Index	K-2
<b>ABC 3580</b>	Bulk Simplex Fiber Optic Cable, 50/125 Graded Index	K-3
<b>ABC 3569</b>	Bulk Simplex Fiber Optic Cable, 62.5/125 Graded Index	K-4
<b>ABC 3821</b>	Bulk Simplex Fiber Optic Cable, 62.5/125 Graded Index (ETFE Jacket)	K-5
<b>ABC 3571</b>	Bulk Simplex Fiber Optic Cable, 100/140 Graded Index	K-6
<b>MIL-T-81914 Convoluted Tubing</b>		
<b>120-100</b>	Series 74 Helical Convoluted Tubing	K-7
<b>120-103</b>	Series 74 Helical Convoluted Tubing with Braid	K-8
<b>120-108/120-132</b>	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.

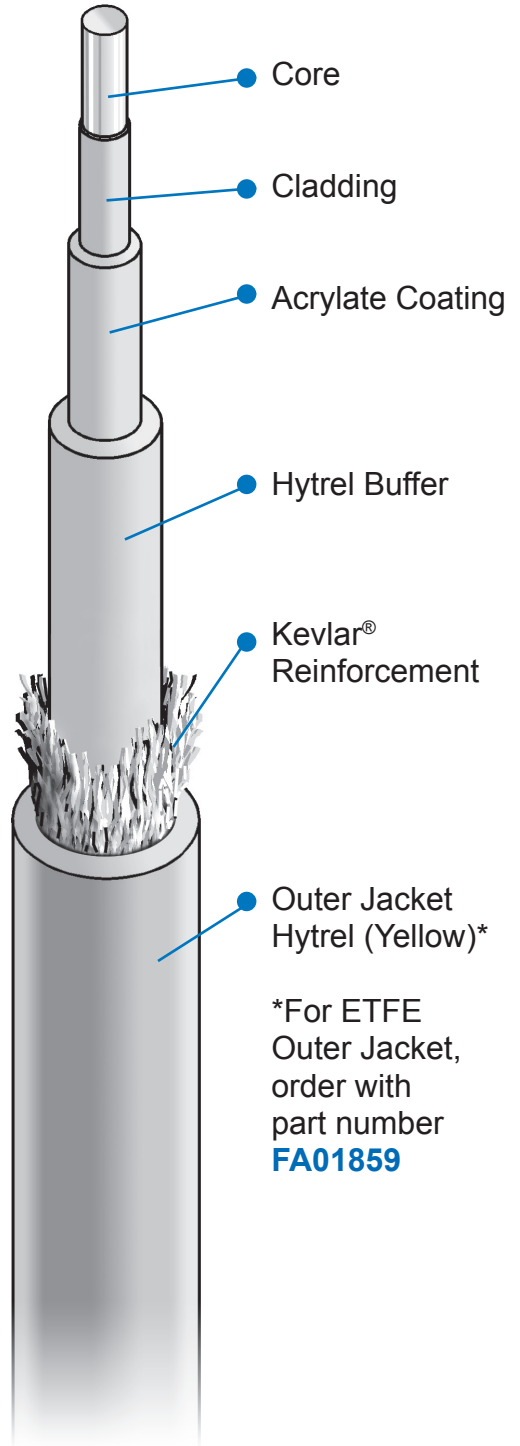
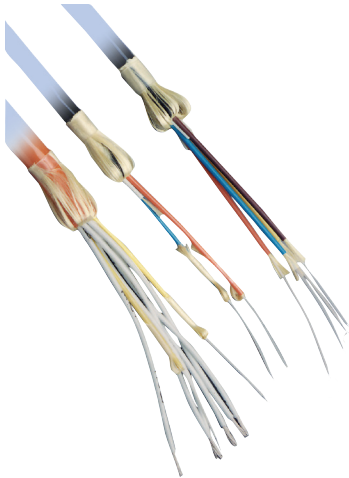
Unless otherwise specified, the following other dimensional tolerances apply:

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



**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	3.0 dB/km
@ 1550 nm	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

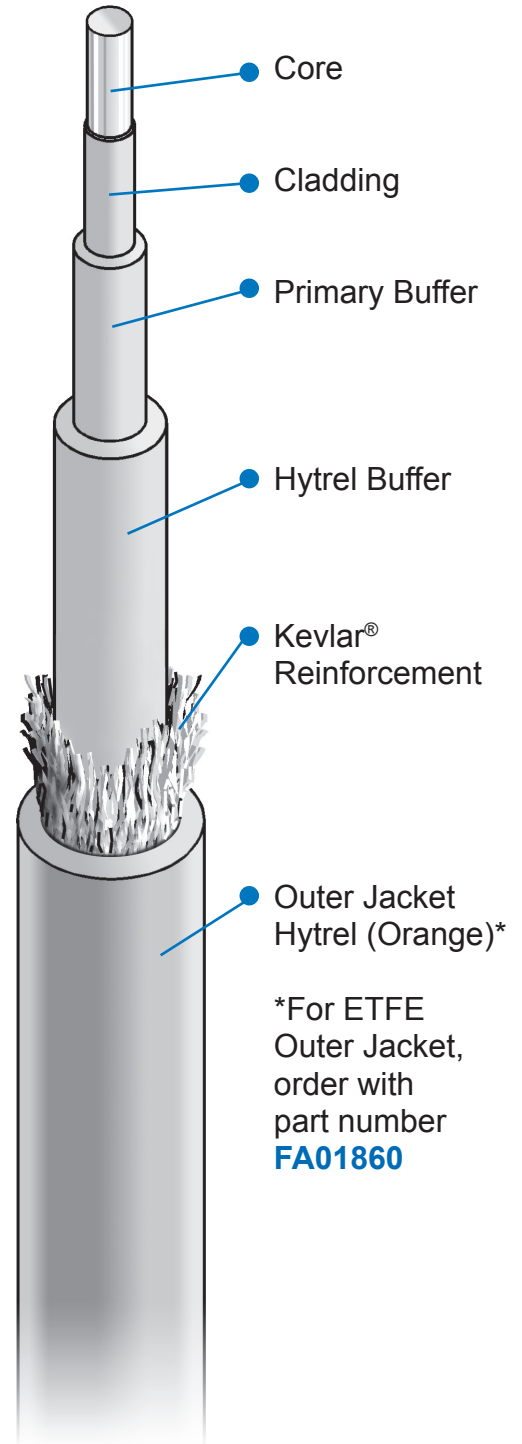
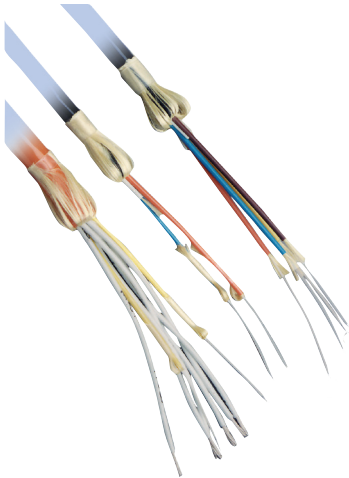
K

Kevlar® is a registered trademark of DuPont Company.

**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 $\mu\text{m} \pm 3 \mu\text{m}$
Cladding Diameter	125 $\mu\text{m} \pm 3 \mu\text{m}$
Primary Buffer	500 $\mu\text{m} \pm 25 \mu\text{m}$
Secondary Buffer	900 $\mu\text{m} \pm 50 \mu\text{m}$
Jacket	.083 $\pm$ .007 Inch Diameter
Attenuation:	
@ 850 nm	4.0 dB/km
@ 1300 nm	2.5 dB/km
Bandwidth:	
@ 850 nm	400 Mhz/km Minimum
@ 1300 nm	400 Mhz/km Minimum
Numerical Aperture	.200 Nominal
Index Profile	Graded
Proof Test	100 KPSI
Operating Temperature	-40° C to +85° C

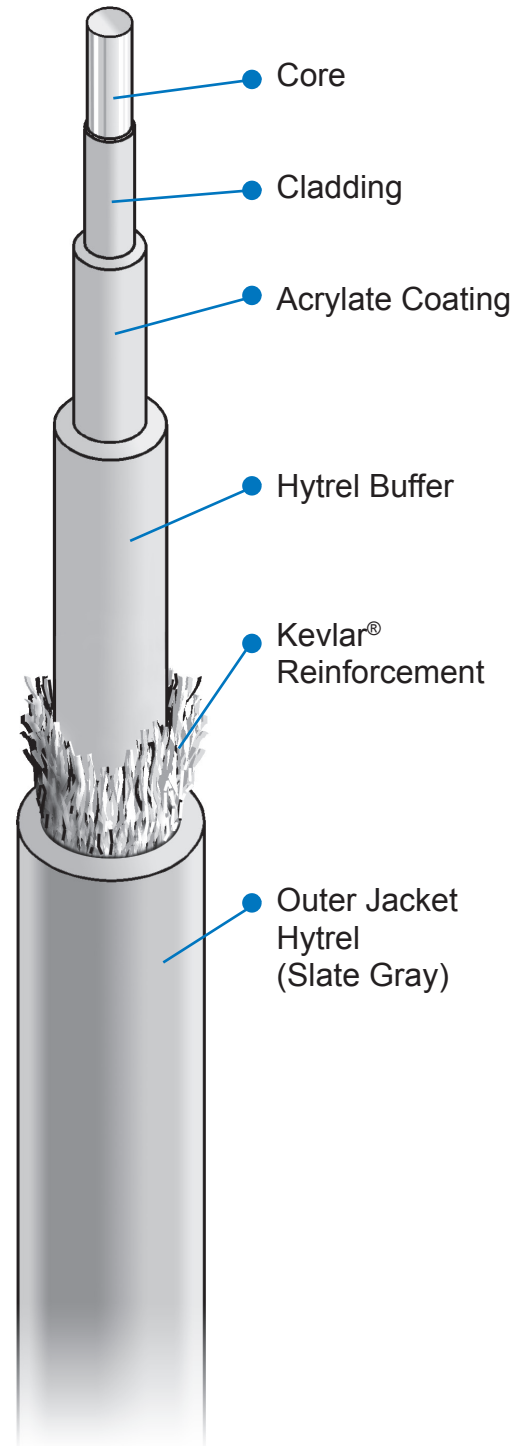
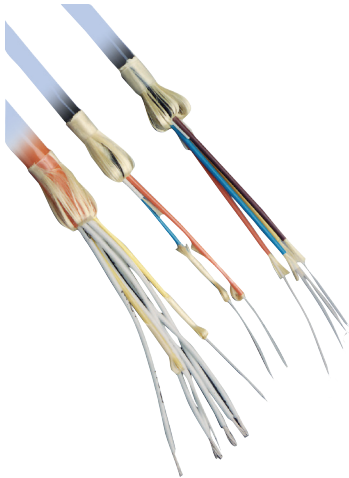
**Consult Factory for price in feet or meters and for Standard Length Tolerance**

Glenair also carries 62.5 and 50  $\mu\text{m}$  Multimode fiber that meet FAR25 flammability requirements. Consult factory for more information.

Kevlar<sup>®</sup> is a registered trademark of DuPont Company.

\*For ETFE Outer Jacket, order with part number **FA01860**



**62.5/125 Multimode graded index fiber optic cable**


Cable Specifications	
Core/Mode Field Diameter	62.5 $\mu\text{m} \pm 3 \mu\text{m}$
Cladding Diameter	125 $\mu\text{m} \pm 3 \mu\text{m}$
Primary Buffer	500 $\mu\text{m} \pm 25 \mu\text{m}$
Secondary Buffer	900 $\mu\text{m} \pm 50 \mu\text{m}$
Jacket	.083 $\pm$ .007 Inch Diameter
Attenuation:	
@ 850 nm	4.0 dB/km
@ 1300 nm	2.0 dB/km
Bandwidth:	
@ 850 nm	160 Mhz/km Minimum
@ 1300 nm	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  $\mu\text{m}$  Multimode fiber that meet FAR25 flammability requirements. Consult factory for more information.

Kevlar® is a registered trademark of DuPont Company.

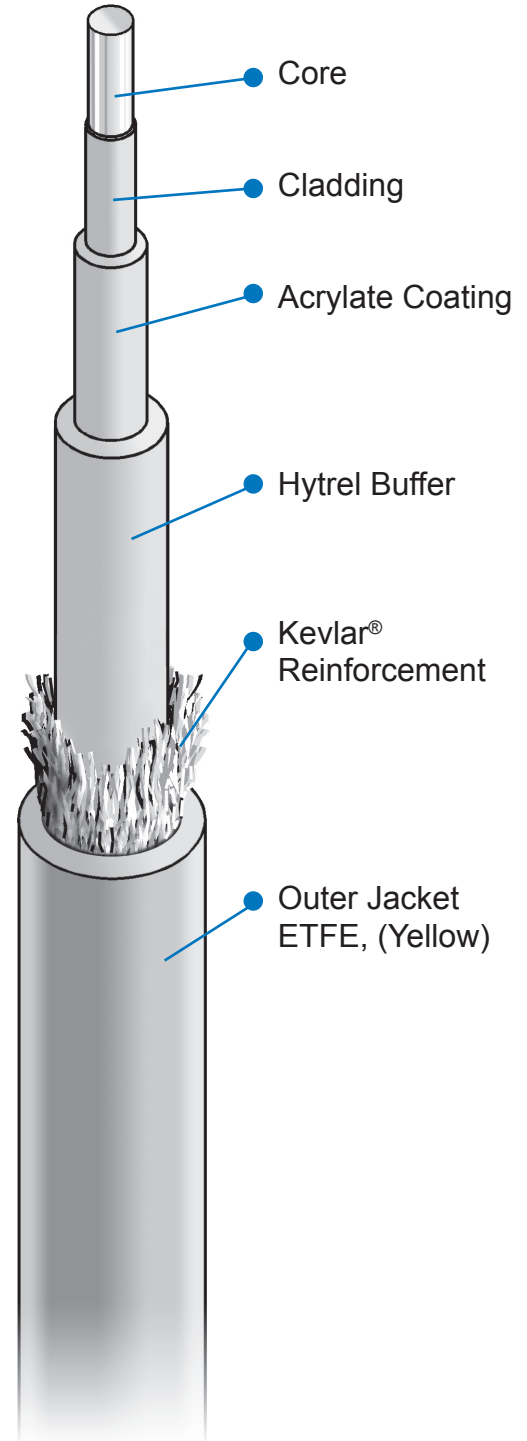
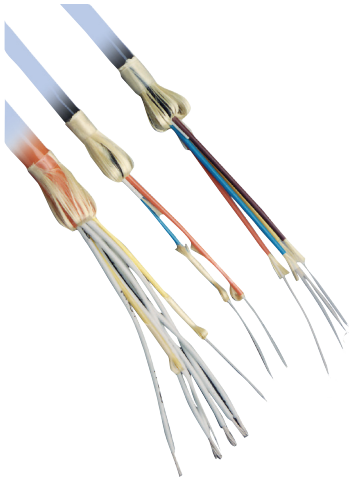
**K**



**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 $\mu\text{m} \pm 3 \mu\text{m}$
Cladding Diameter	125 $\mu\text{m} \pm 3 \mu\text{m}$
Primary Buffer	500 $\mu\text{m} \pm 25 \mu\text{m}$
Secondary Buffer	900 $\mu\text{m} \pm 50 \mu\text{m}$
Jacket	.083 $\pm$ .007 Inch Diameter
Attenuation:	
@ 850 nm	4.0 dB/km
@ 1300 nm	2.0 dB/km
Bandwidth:	
@ 850 nm	160 Mhz/km Minimum
@ 1300 nm	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**

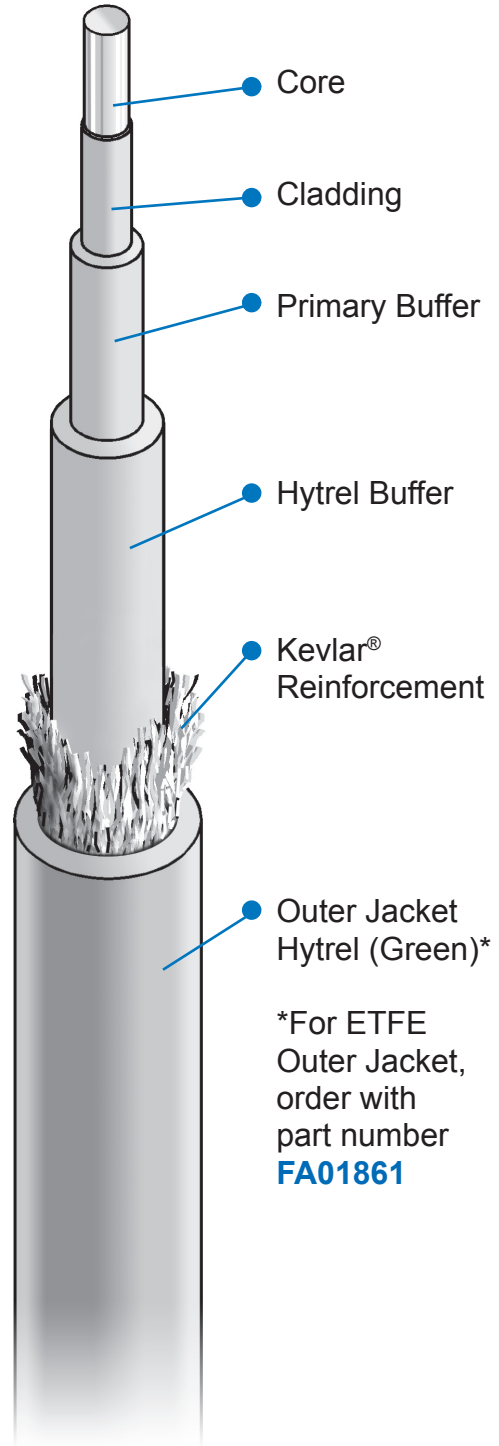
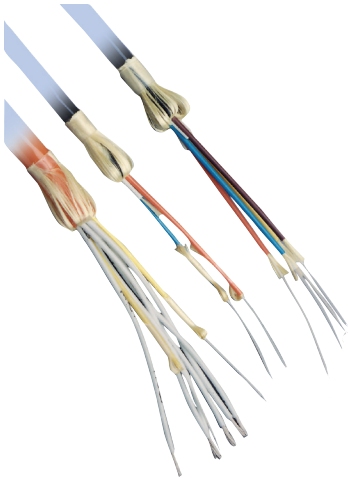
Glenair also carries 62.5 and 50  $\mu\text{m}$  Multimode fiber that meet FAR25 flammability requirements. Consult factory for more information.

Kevlar® is a registered trademark of DuPont Company.



**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
<b>Attenuation:</b>	
@ 850 nm	6.0 dB/km
@ 1300 nm	4.0 dB/km
<b>Bandwidth:</b>	
@ 850 nm	100 Mhz/km Minimum
@ 1300 nm	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**

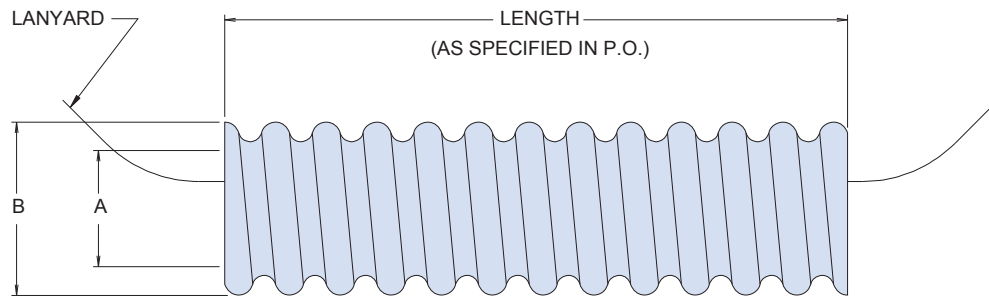
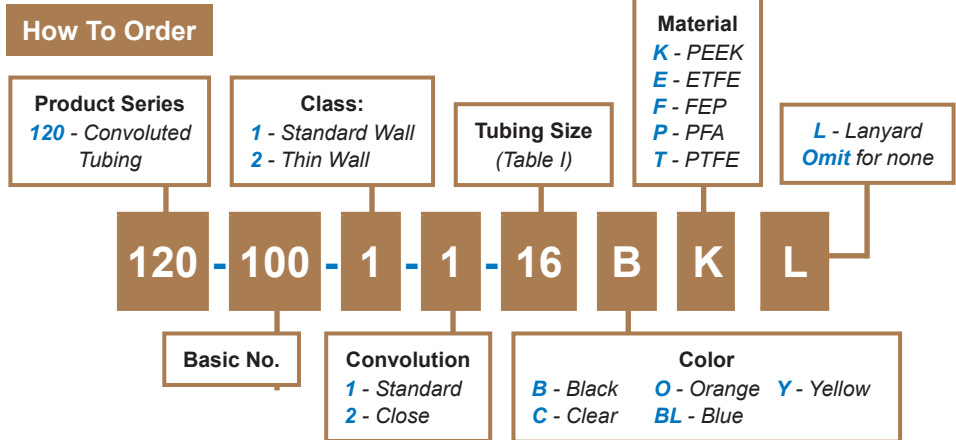
Kevlar® is a registered trademark of DuPont Company.

K

120-100  
Helical Polymer-Core Convulsed Tubing  
In Accordance With SAE AMS-81914

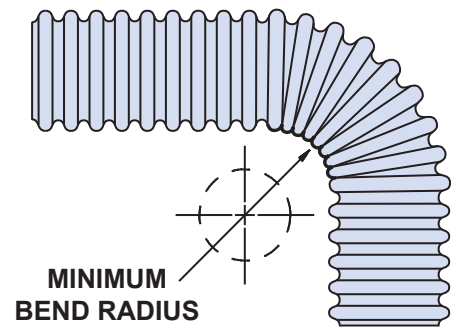


**Outstanding mechanical wire protection and lubricity for non-environmental and non-EMI/RFI applications**



**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)



**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.



**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**

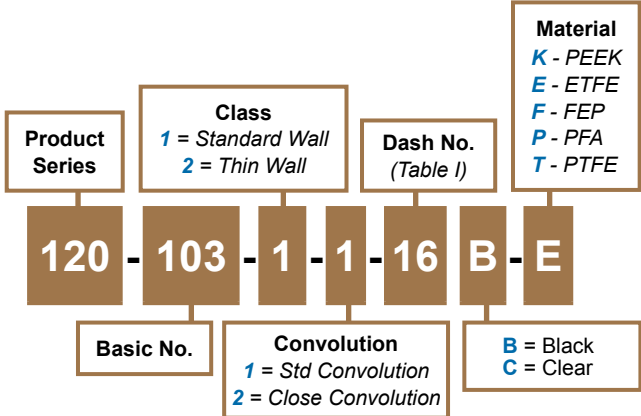
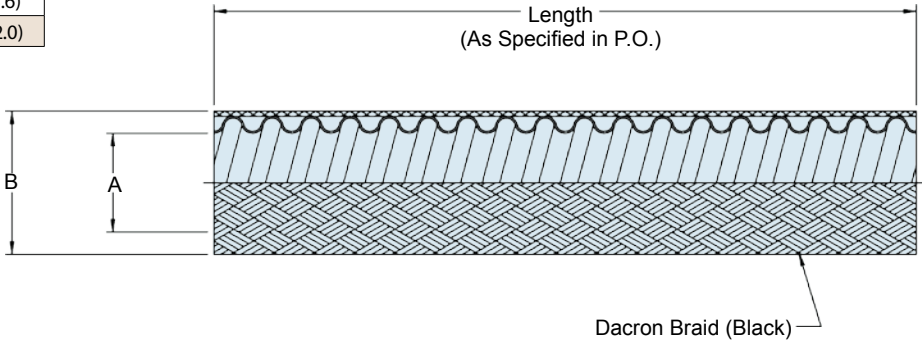


Table I				
Dash No.	Frac. Size	Ø A Inside		Ø B Max
		Min	Max	
06	3/16	.181	.188	.430 (10.9)
09	9/32	.273	.281	.474 (12.0)
10	5/16	.306	.312	.510 (10.2)
12	3/8	.359	.375	.571 (14.5)
14	7/16	.427	.437	.631 (16.0)
16	1/2	.480	.500	.710 (18.0)
20	5/8	.603	.625	.830 (21.1)
24	3/4	.725	.750	.990 (25.1)
28	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.

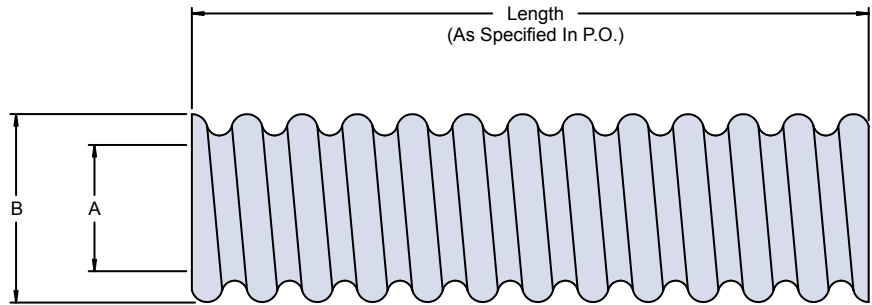
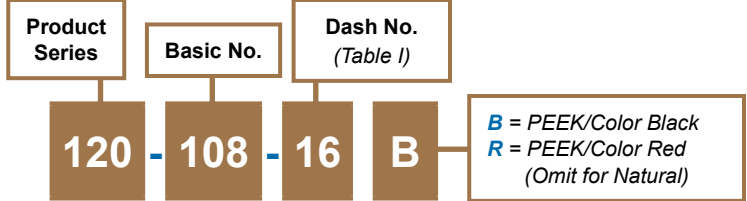
120-108 • 120-132  
 Standard and Ultra Small Diameter  
 PEEK Helical Convulsed Tubing  
 IAW DMS 2024 Type II for Fiber Optic Applications



**Standard diameter low-smoke, zero-halogen tubing with outstanding crush resistance**



**How To Order**



Tubing Size	Fractional Size Ref	A Inside Dia		B Dia Max
		Min	Nom	
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)

Tubing Size	Fractional Size Ref	A Inside Dia		B Dia Max
		Min	Nom	
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)

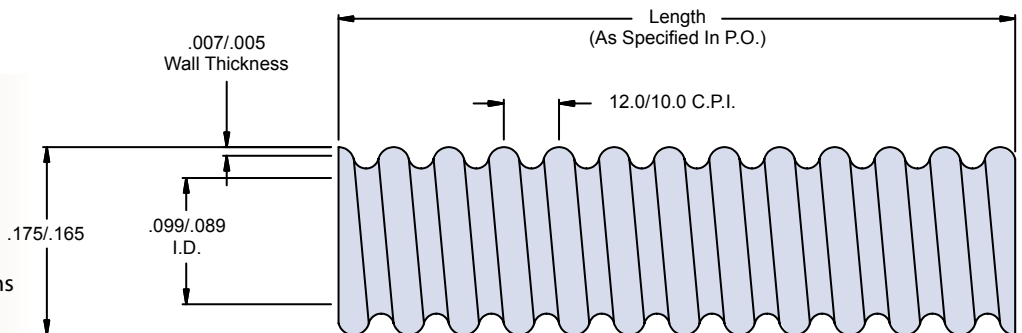
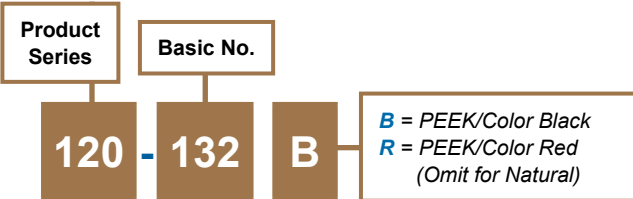
**Packaging / Notes**

- 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**



**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.



**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.
<b>Fiber Optic Preparation and Termination Equipment</b>		
<b>187-017 • 187-018</b>	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
<b>Fiber Optic Inspection and Test Equipment</b>		
<b>GTK1000</b>	Front Release Testing Kit	L-12
<b>ABC 54705</b>	Fiber Optic Test Probe	L-14
<b>182-002</b>	Polishing Tool for test probes	L-14
<b>180-049/180-050/ 180-053</b>	M29504 Feedthrough Probe Connectors	L-15
<b>180-044</b>	Plug and Receptacle Test Adapters, MIL-DTL-38999 Series III	L-16
<b>180-072</b>	Plug and Receptacle Test Adapters, MIL-DTL-38999 Series I	L-20
<b>180-073</b>	Plug and Receptacle Test Adapters, MIL-DTL-38999 Series III	L-24
<b>180-102 (06)</b>	Fiber Optic Probe Adapter, Plug	L-28
<b>180-102 (07)</b>	Fiber Optic Probe Adapter, Receptacle	L-29
<b>FO1006</b>	Patch Cord - Simplex	L-30
<b>FO1007</b>	Patch Cord - Duplex	L-31
<b>Fiber Optic Cleaning and Troubleshooting Equipment</b>		
<b>GBS1000/GBS1001</b>	Portable Video Bore Scope Inspection System	L-34
<b>GCLT</b>	Dry Action Cleaning Tools	L-36
<b>187-021/187-024/ 187-045</b>	Fiber Optic Cleaning Swabs	L-37
<b>General-Purpose Tools</b>		
<b>600-058/600-061</b>	Band-Master™ ATS Termination System Banding Tools	L-38
<b>600-052/600-057 600-083/600-090</b>	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.

### 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°



## Fiber optic cable preparation and termination instructions

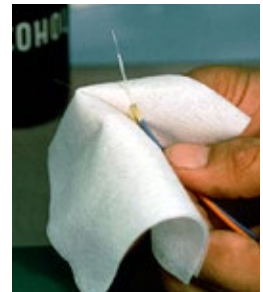
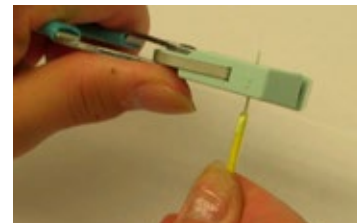
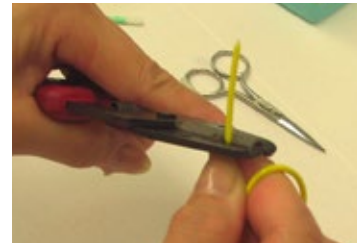
### The Right Fiber Optic Tool for the Job

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.



### 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

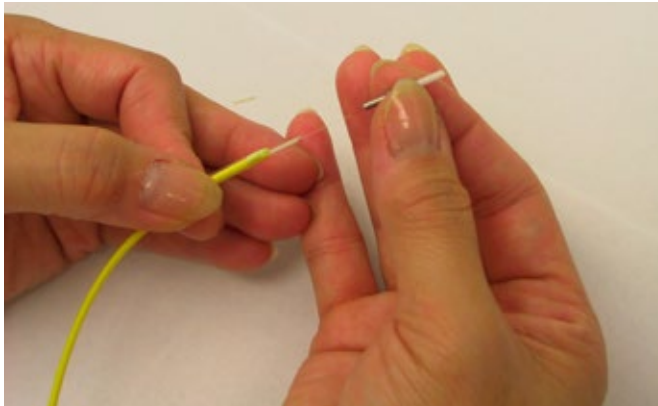
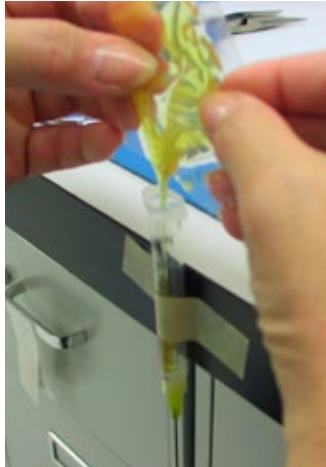


*Glenair Fiber Optic Toolkits contains all of the tools you will need for fiber optic termination, plus a laminated card with termination instructions.*



## Typical Fiber 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](http://www.glenair.com) or our youtube channel at [www.youtube.com/user/GlenairInc](http://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.



## 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

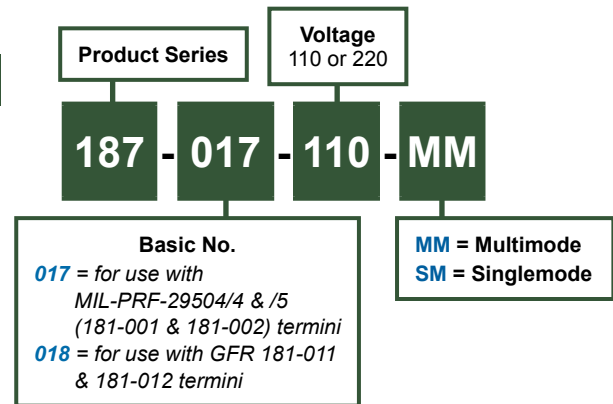
### Fiber optic termination kit for field termination and repair of optical interconnects



- 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



### 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.



## Fiber optic polishing pucks



Polishing Puck showing grooves for wet polish

Part Number	Compatible Termini			
<b>M29504 type (MIL-DTL-38999 Series III type) termini</b>				
<b>182-001P*</b>	181-002	M29504/04 Pin	*add <b>W</b> to part number for Wet Polish, Supplied with Grooves. Omit for Dry Polish, Less Grooves	
	181-036	Large Core Size 16 Pin Terminus		
<b>182-001S*</b>	181-001	M29504/05 Socket		
	181-035	Large Core Size 16 Socket Terminus		
<b>182-039P*</b>	181-065	Size 20 Pin Terminus		
<b>182-039S*</b>	181-066	Size 20 Socket Terminus		
<b>182-030</b>	181-052	Jewel Pin Terminus, Size 16		Supplied with Grooves for Wet Polish
	181-053	Jewel Socket Terminus, Size 16		
<b>GHD termini</b>				
<b>182-018*</b>	181-047	GHD Size 18 keyed genderless terminus		*add <b>W</b> to part number for Wet Polish, Supplied with Grooves. Omit for Dry Polish, Less Grooves
	181-056	GHD Size 18 non-keyed genderless terminus		
<b>Mighty Mouse termini</b>				
<b>182-001P*</b>	181-057	Mighty Mouse Size 16 Pin Terminus	*add <b>W</b> to part number for Wet Polish, Supplied with Grooves. Omit for Dry Polish, Less Grooves	
<b>182-045*</b>	181-075	Mighty Mouse Size 16 Socket Terminus		
<b>182-056P*</b>	181-084	Mighty Mouse Size 20HD Pin Terminus		
<b>182-056S*</b>	181-085	Mighty Mouse Size 20HD Socket Terminus		
<b>182-050P*</b>	181-063	Mighty Mouse Size 23 Pin Terminus		
<b>182-050S*</b>	181-064	Mighty Mouse Size 23 Socket Terminus		
<b>GFR termini</b>				
<b>182-005P*</b>	181-012	GFR Size 16 Pin	*add <b>W</b> to part number for Wet Polish, Supplied with Grooves. Omit for Dry Polish, Less Grooves	
<b>182-005S*</b>	181-011	GFR Size 16 Socket		
<b>NGCON termini</b>				
<b>182-021*</b>	181-043	NGCON Genderless Rear-Release Terminus	*add <b>W</b> to part number for Wet Polish, Supplied with Grooves. Omit for Dry Polish, Less Grooves	
<b>GFOCA termini</b>				
<b>182-007*</b>	181-050	M29504/16 type genderless GFOCA fiber optic terminus	*add <b>W</b> to part number for Wet Polish, Supplied with Grooves. Omit for Dry Polish, Less Grooves	
<b>M29504 type (MIL-PRF-28876) termini</b>				
<b>182-035*</b>	181-039	M29504/14 Pin	*add <b>W</b> to part number for Wet Polish, Supplied with Grooves. Omit for Dry Polish, Less Grooves	
	181-040	M29504/15 Socket		

## 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.





1. Attach test probe jumpers to light source and power meter



4. Connect the jumper (link) to be tested to the zeroed assembly.



2. Insert probes into connector adapters
3. Mate connector adapters together and 'zero' power meter



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](http://www.glenair.com) or our youtube channel at [www.youtube.com/user/GlenairInc](http://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.





**Insertion/extraction tool for size 16 M29504 04/05 rear-release fiber optic termini and size 16 Mighty Mouse termini**

Part Number	Compatible Termini	
<b>809-131</b>	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	
<b>809-207</b>	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	
<b>182-031</b>	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	
<b>182-032</b>	181-053	D38999 type fiber optic jewel socket terminus

**Extraction tool for size 18 GHD front-release fiber optic termini**

Part Number	Compatible Termini	
<b>182-011-18</b>	181-047	GHD Size 18 keyed front release genderless terminus
	181-056	GHD Size 18 non-keyed front release genderless terminus

**Insertion tool for buffered GHD keyed fiber optic termini**

Part Number	Compatible Termini	
<b>182-019</b>	181-047	GHD Size 18 keyed front release genderless terminus

**Insertion/extraction tool for size 20HD mighty mouse rear-release fiber optic termini**

Part Number	Compatible Termini	
<b>859-017</b>	181-084	Mighty Mouse #20HD Pin Terminus
	181-085	Mighty Mouse #20HD Socket Terminus

**Insertion/extraction tool for size 23 mighty mouse rear-release fiber optic termini**

Part Number	Compatible Termini	
<b>809-088</b>	181-063	Mighty Mouse #23 Pin Terminus
	181-064	Mighty Mouse #23 Socket Terminus







### ***Straight insertion tool for fiber optic termini***

Part Number	Compatible Termini	
182-013	181-039	M29504/14 Pin
	181-040	M29504/15 Socket
	181-051	M29504/03 Dummy
	181-011	Glenair Front Release (GFR) #16 Socket
	181-012	Glenair Front Release (GFR) #16 Pin
	181-056	Genderless GHD, Non-Keyed
	181-047	Genderless GHD, Keyed
	181-043	NGCON Genderless Rear-Release Terminus

### ***Right angle (90°) insertion tool for fiber optic termini***

Part Number	Compatible Termini	
182-014	181-039	M29504/14 Pin
	181-040	M29504/15 Socket
	181-051	M29504/03 Dummy
	181-011	Glenair Front Release (GFR) #16 Socket
	181-012	Glenair Front Release (GFR) #16 Pin
	181-056	Genderless GHD, Non-Keyed
	181-047	Genderless GHD, Keyed
	181-043	NGCON Genderless Rear-Release Terminus

*The 182-014 90° tool can be used when there is limited space behind the connector to use the straight tool*

### ***Extraction tool for front-release fiber optic termini***

Part Number	Compatible Termini	
182-015	181-039	M29504/14 Pin
	181-040	M29504/15 Socket
	181-051	M29504/03 Dummy
	181-011	Glenair Front Release (GFR) #16 Socket
	181-012	Glenair Front Release (GFR) #16 Pin

**Alignment sleeve insertion/extraction tool for fiber optic termini**

Part Number	Compatible Termini	
182-016	181-040	M29504/15 Socket
	181-011	Glenair Front Release (GFR) #16 Socket

**Insertion/extraction tool for GFOCA fiber optic termini**

Part Number	Compatible Termini	
182-010	181-050	M29504/16 type genderless GFOCA fiber optic terminus

**Fiber optic terminus crimping tool for M29504 14/15, GFR, GHD, GFOCA and NGCON**

Part Number	Compatible Termini	
182-012	181-039	M29504/14 Pin
	181-040	M29504/15 Socket
	181-011	Glenair Front Release (GFR) #16 Socket
	181-012	Glenair Front Release (GFR) #16 Pin
	181-056	Genderless GHD, Non-Keyed
	181-047	Genderless GHD, Keyed
	181-043	NGCON Genderless Rear-Release Terminus
	181-050	M29504/16 type genderless GFOCA fiber optic terminus

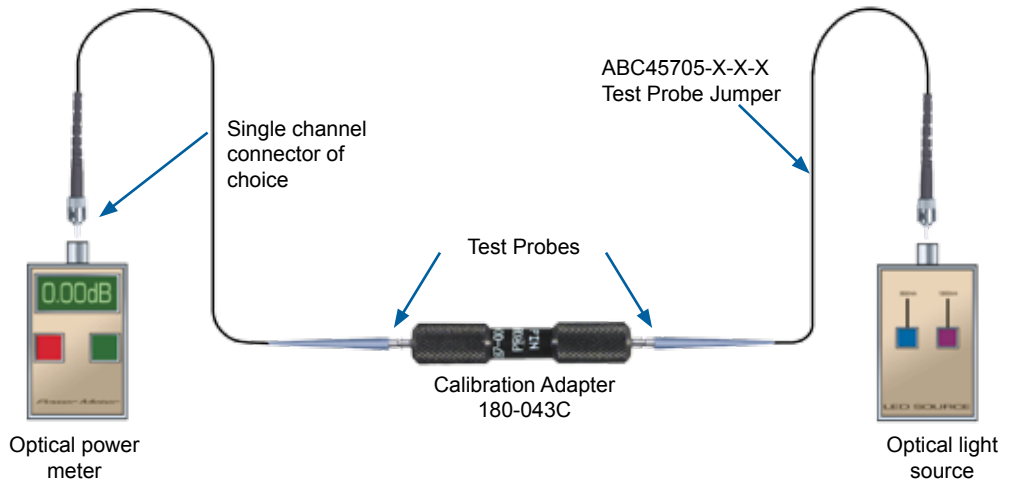
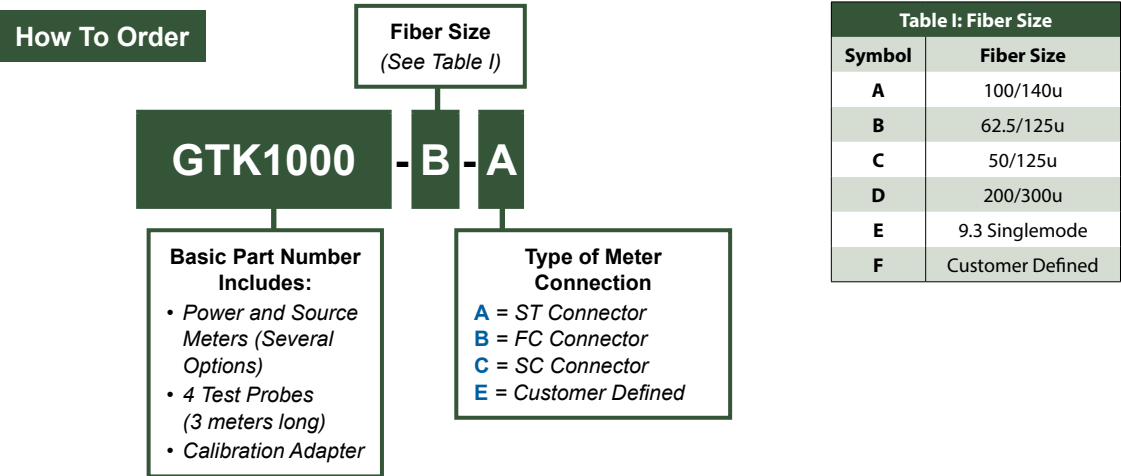


# GTK1000 Glenair Fiber Optic Testing Kit for MIL-DTL-38999 Series III Fiber Optic Connection Systems

## Fiber optic testing kit for fiber optic connection systems

Traditional optical test harnesses are expensive and easily contaminated in normal use. The Glenair fiber optic testing kit utilizes a special probe device in conjunction with our precise-mating test adapter, to provide a complete solution to optical test and measurement. The GTK-1000 comes with a power meter, source meter, test probes and a test probe calibration adapter. For accurate results, the test probe calibration adapter will “zero out” your meters.

The Glenair patented test probe design provides less than 1.0 dB insertion loss, and is used with test probe adapters and a calibration feedthrough to perform efficient measurements of fiber optic cable performance. The kit accommodates all standard fiber sizes and multiple fiber optic connection systems



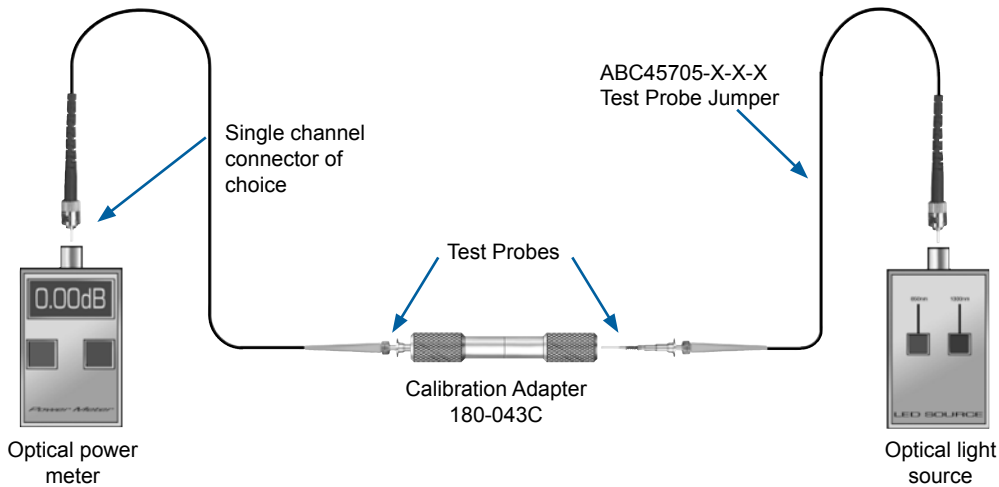
**Note:**  
 Replacement calibration adapters and test probe jumpers sold separately.  
 Test probe connector adapters sold separately  
 The fiber optic test probe kit supports MIL-DTL-38999 Series I and III fiber optic connection systems. For test kits for other Glenair high performance fiber optic connection systems, please consult factory.

**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."

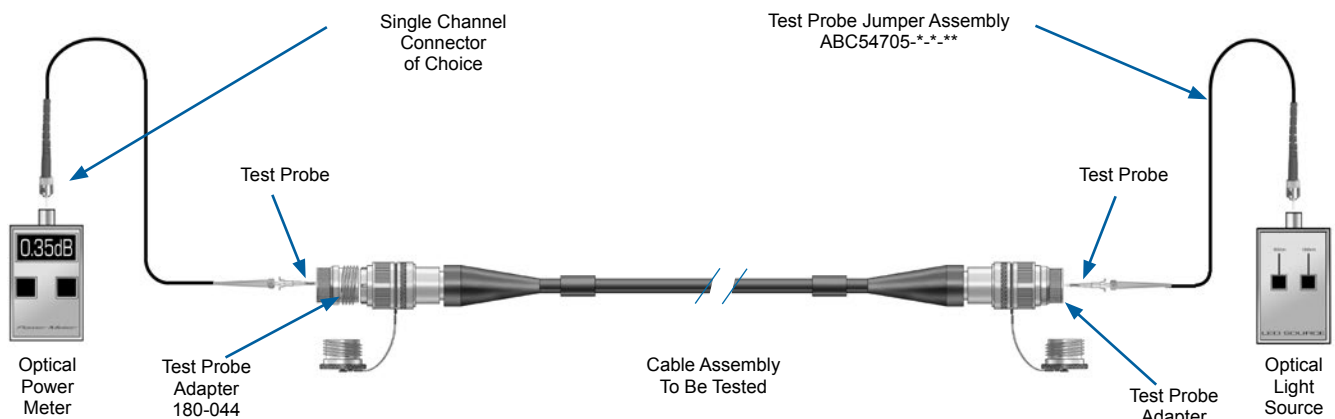


**Step 2: Performing optical measurement**

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.





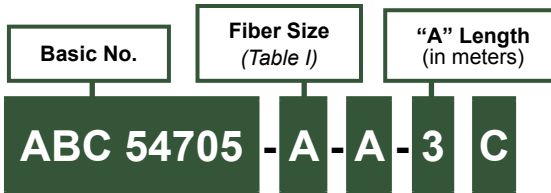
# ABC 54705 Replacement Fiber Optic Test Probe Jumper Simplex

**Fiber optic test probe for fast and easy optical analysis of installed fiber optic systems**

### How To Order

Table I: Fiber Size	
Symbol	Size
A	100/140 $\mu\text{m}$
B	62.5/125 $\mu\text{m}$
C	50/125 $\mu\text{m}$
D	200/230 $\mu\text{m}$
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

Optical insertion loss  $\leq 1.0$  dB @  
850 or 1300 nm wavelength.  
Glenair Fiber Optic Test Probe U.S.  
Patent Number 5,960,137.

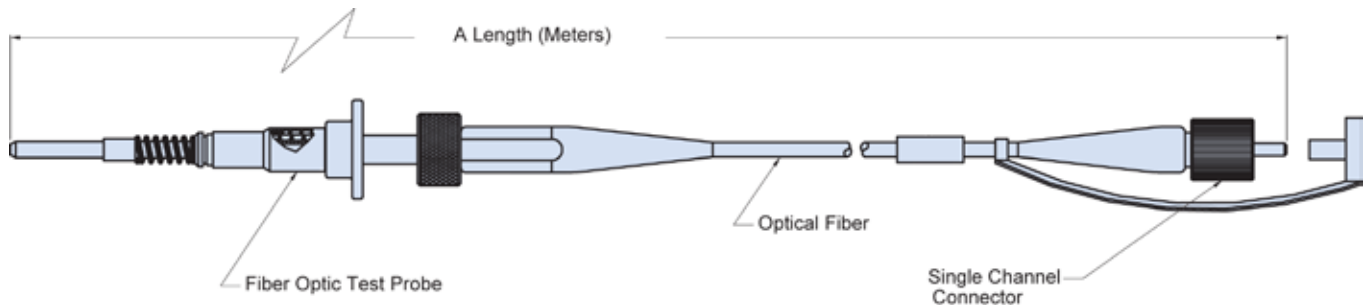


#### Connector Type:

- 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)

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

182

002

002

W = Wet Polish  
Supplied with V-Grooves  
(Omit for Dry Polish)

W

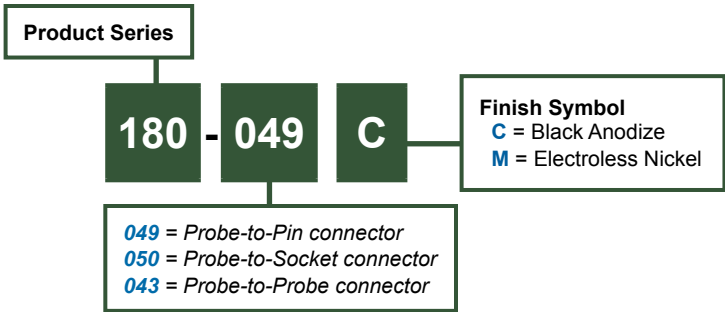
Basic No.

180-049 • 180-050 • 180-043  
 Replacement Calibration Adapters  
 for M29504/04 or /05 Termini

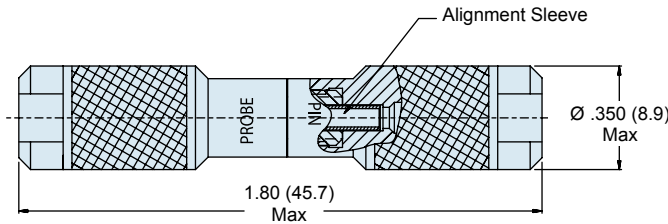


**Feedthrough probe connectors for MIL-DTL-38999 (MIL-PRF-29504/4 and /5 termini) fiber optic connection system**

U.S. PATENT 5,960,137

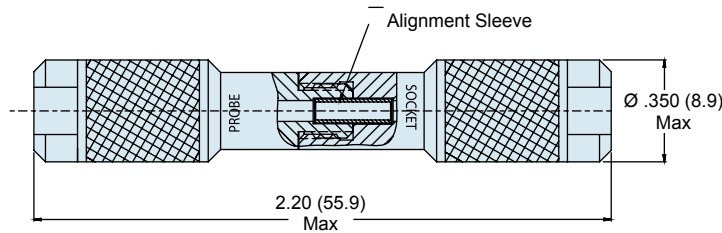


**-049 Probe-to-Pin Connector**



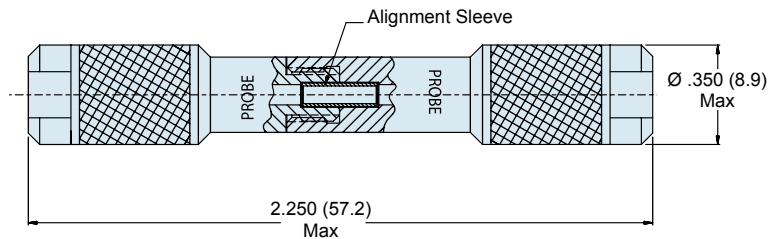
Pin Side Accepts  
181-002 and M29504/04  
Termini

**-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



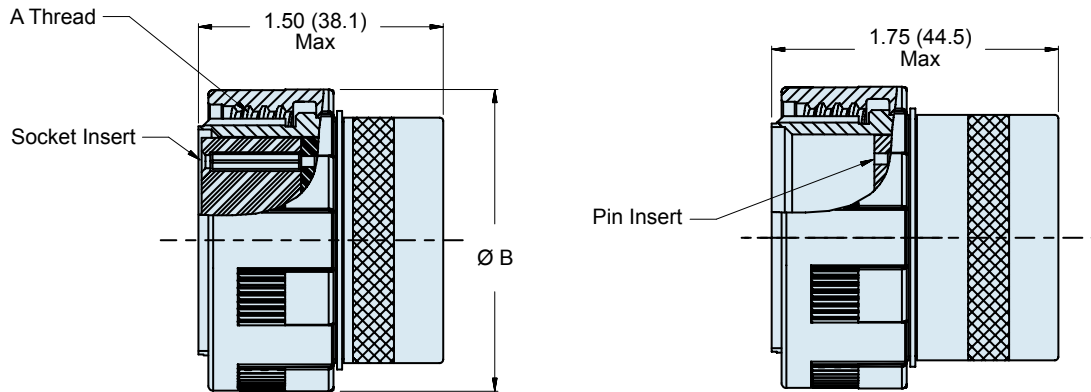
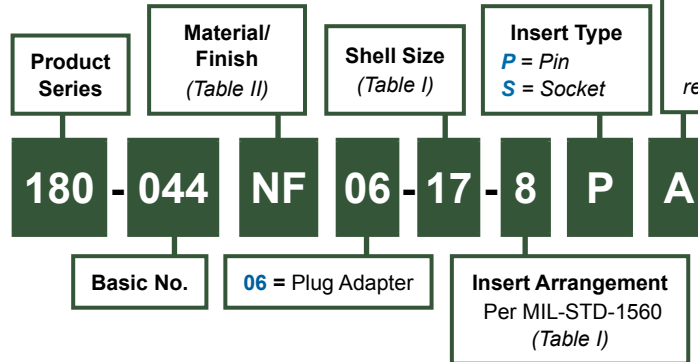


180-044 (06)

**Fiber Optic Test Adapter, Plug**  
MIL-DTL-38999 Series III

**MIL-DTL-38999 test adapter (plug)**

**How To Order**



**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.

**180-044 (06)**  
**Fiber Optic Test Adapter, Plug**  
**MIL-DTL-38999 Series III**



Test Probes  
and Kits

**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	23-54	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

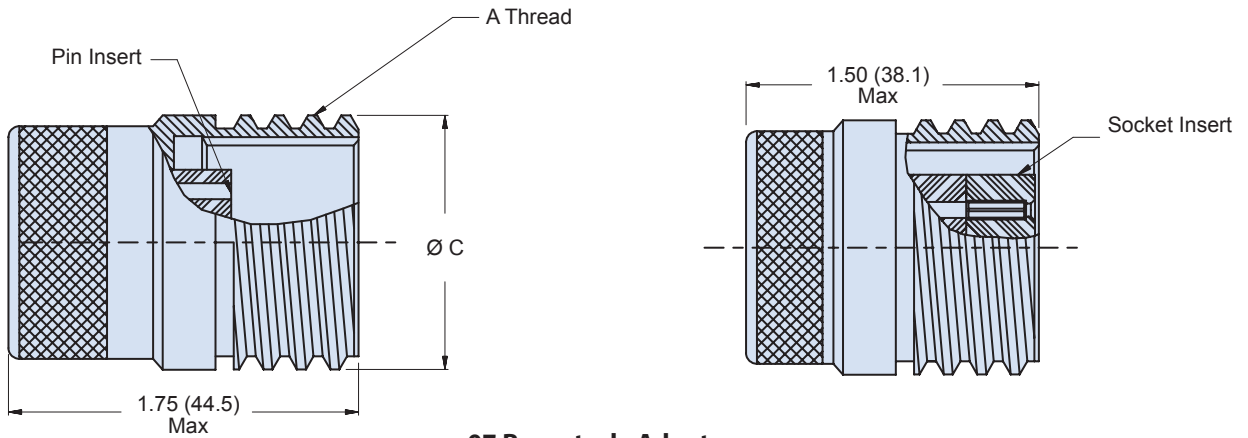
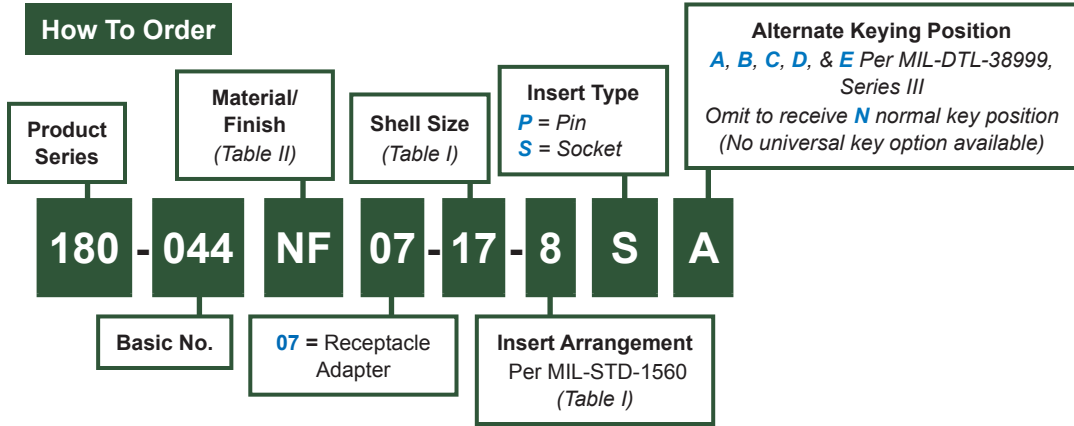




180-044 (07)

Fiber Optic Test Adapter, Receptacle  
MIL-DTL-38999 Series III

MIL-DTL-38999 test adapter (receptacle)



**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**

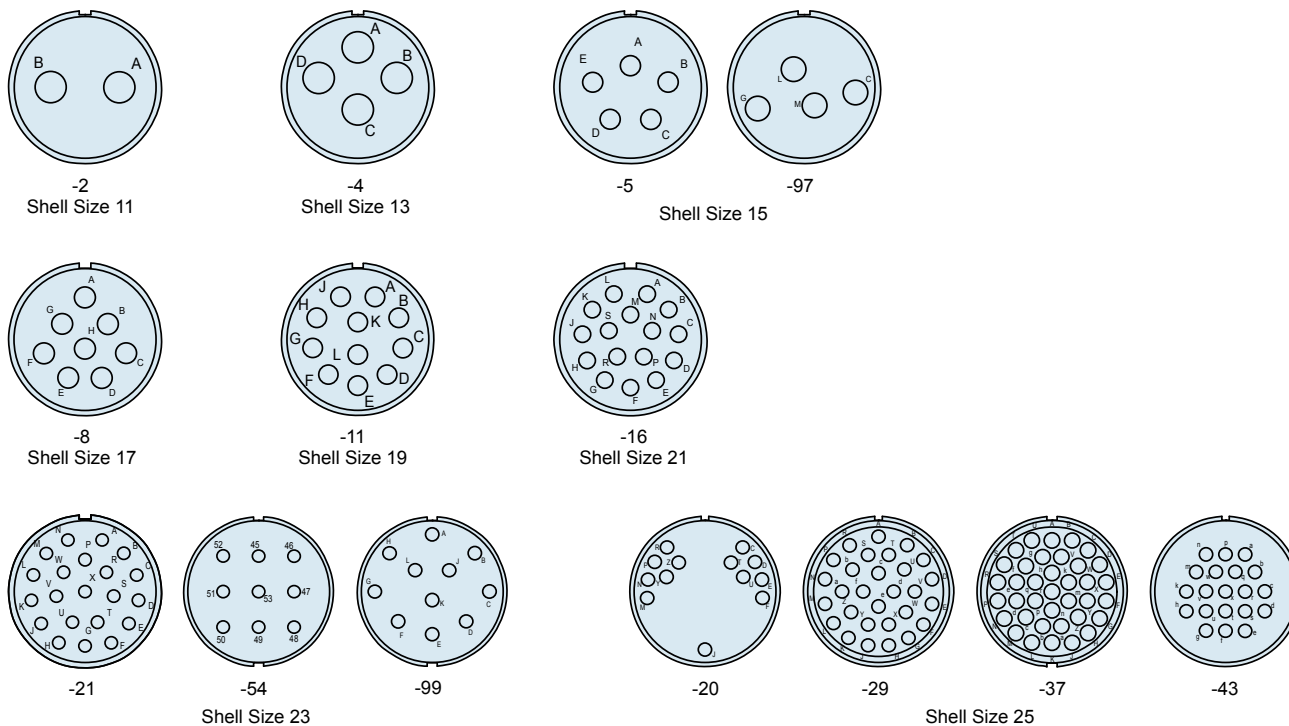
For fiber optic test probe (standard) jumper, see Glenair drawing ABC54705  
 For fiber optic test probe (low profile, probe-to-probe) jumper, see Glenair drawing FO03187.  
 Suggested for 25-37 insert arrangement.

180-044 (07)  
**Fiber Optic Test Adapter, Receptacle**  
 MIL-DTL-38999 Series III



Test Probes  
and Kits

**Insert Arrangements: Socket Rear Insert Shown**

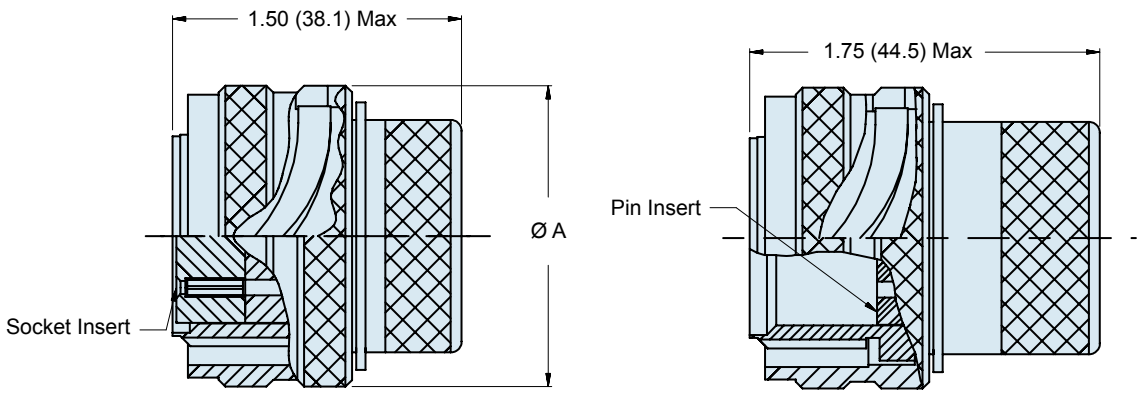
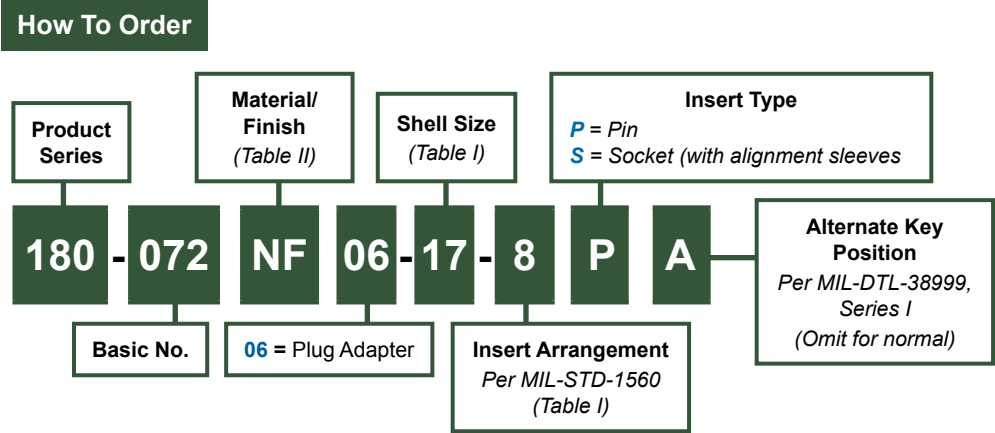


Shell Size	Shell Size Code (Ref)	Shell Size & Insert Arrangement	A Thread 0.1P-0.3L-TS-2	Ø C Max
11	B	11-2	.750 (19.1)	.750 (19.1)
13	C	13-4	.875 (22.2)	.875 (22.2)
15	D	15-5	1.000 (25.4)	1.000 (25.4)
15	D	15-97	1.000 (25.4)	1.000 (25.4)
17	E	17-8	1.187 (30.1)	1.188 (30.2)
19	F	19-11	1.250 (31.8)	1.250 (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	23-54	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)

Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab



**MIL-DTL-38999 test adapter (plug)**



**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

**180-072 (06)**  
**Fiber Optic Test Adapter, Receptacle**  
**MIL-DTL-38999 Series I**



Test Probes  
and Kits

**Table I: Shell Size and Insert Arrangements**

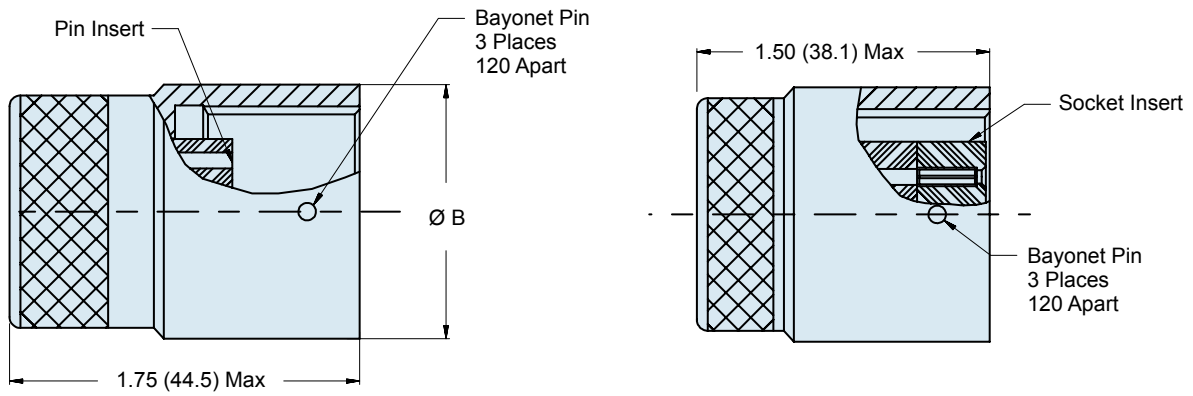
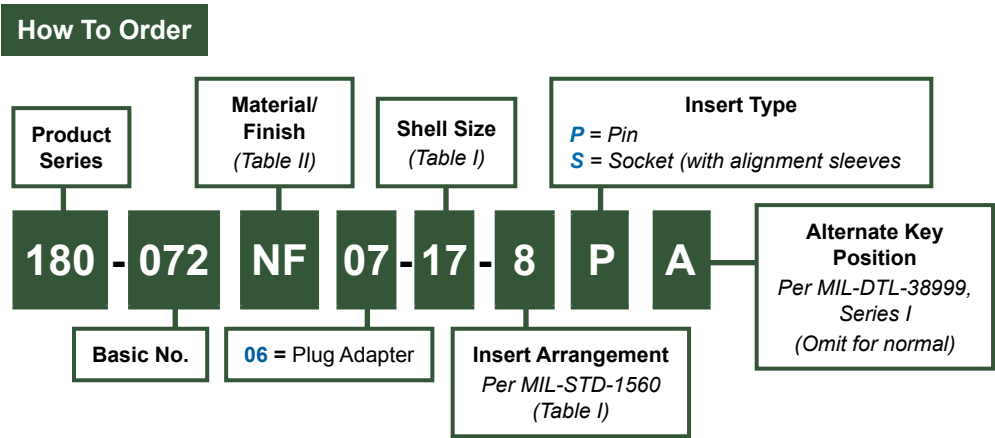
Shell Size & Insert Arrangement	Shell Size Code Ref.	Ø A Max
11-2	B	.964 (24.5)
13-4	C	1.141 (29.0)
15-5	D	1.266 (32.2)
15-97	D	1.266 (32.2)
17-8	E	1.391 (35.3)
19-11	F	1.500 (38.8)
21-16	G	1.625 (41.3)
23-21	H	1.750 (44.5)
23-99	H	1.750 (44.5)
25-20	J	1.875 (47.6)
25-29	J	1.875 (47.6)
25-37A	J	1.875 (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



**MIL-DTL-38999 test adapter (receptacle)**



**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



**180-072 (07)**  
**Fiber Optic Test Adapter, Receptacle**  
**MIL-DTL-38999 Series I**



Test Probes  
and Kits

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)

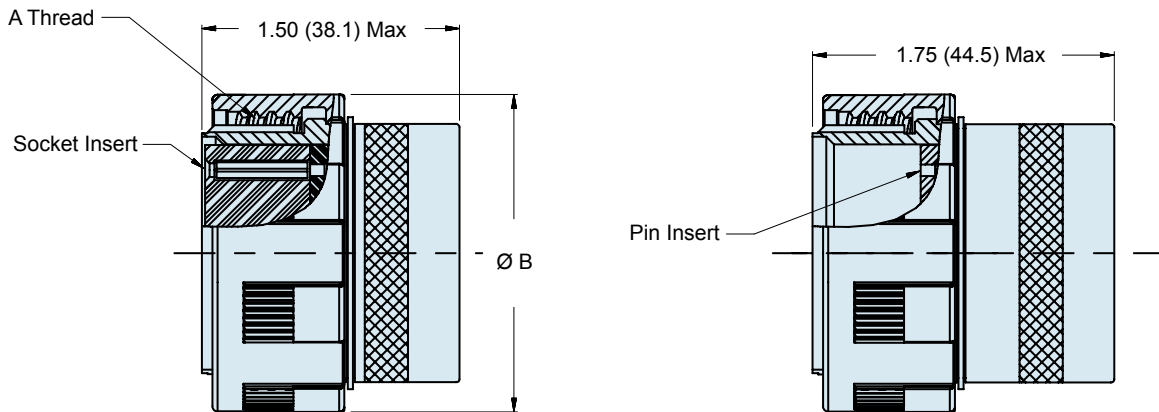
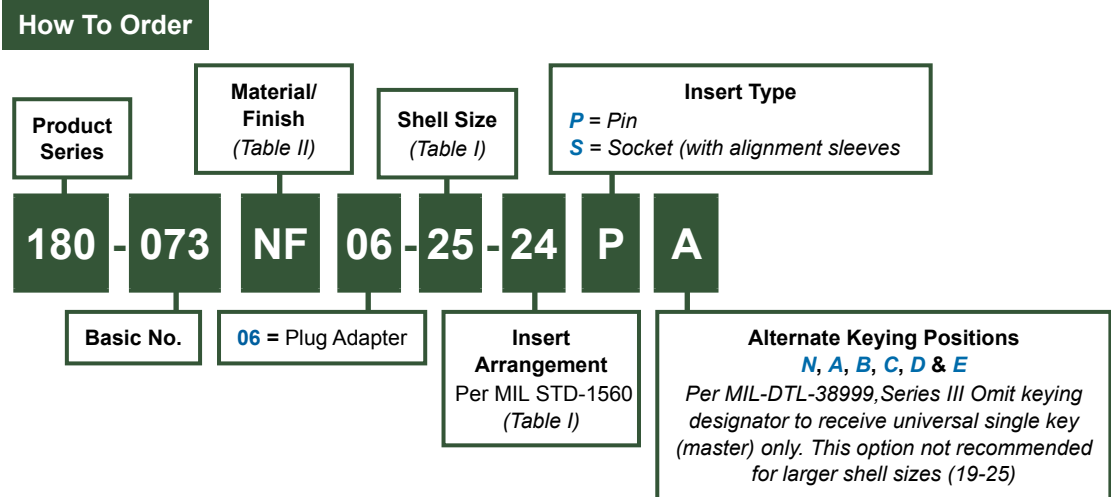
Table II: Material and Finish		
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium/Olive Drab





**180-073 (06)**  
**Fiber Optic Test Adapter, Plug**  
 With Special Insert Arrangement MIL-DTL-38999 Series III

**MIL-DTL-38999 test adapter (plug)**



**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

180-073 (06)  
**Fiber Optic Test Adapter, Plug**  
 With Special Insert Arrangement MIL-DTL-38999 Series III



Test Probes  
and Kits

**FRONT FACE OF PIN AND SOCKET INSERTS SHOWN, REAR SURFACE OPPOSITE**

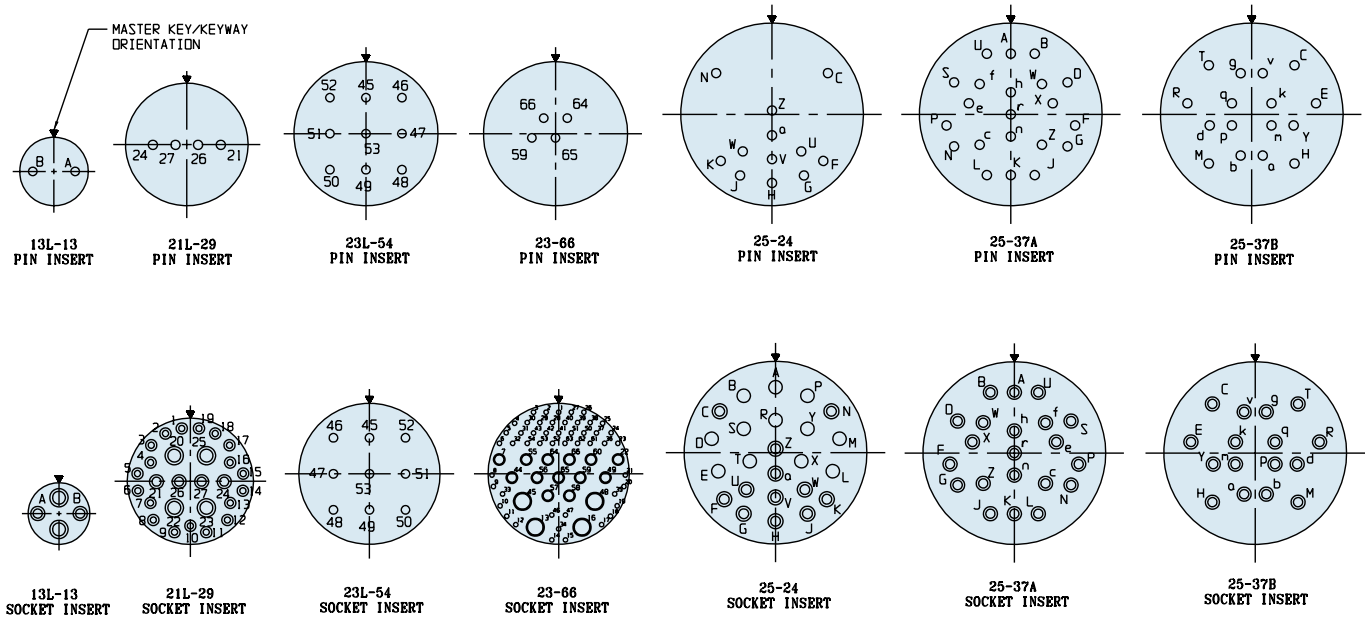


Table I: Shell Size and Insert Arrangements				
Shell Size	Shell Size Code (Ref)	Insert Arrangement Dash No.	A Thread 0.1P-0.3L-TS-2	Ø B Max
13	C	13L-13	.875 (22.2)	1.157 (29.4)
21	G	21L-29	1.375 (34.9)	1.642 (41.7)
23	H	23L-54	1.500 (38.1)	1.768 (44.9)
23	H	23-66	1.500 (38.1)	1.768(44.9)
25	J	25-24	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

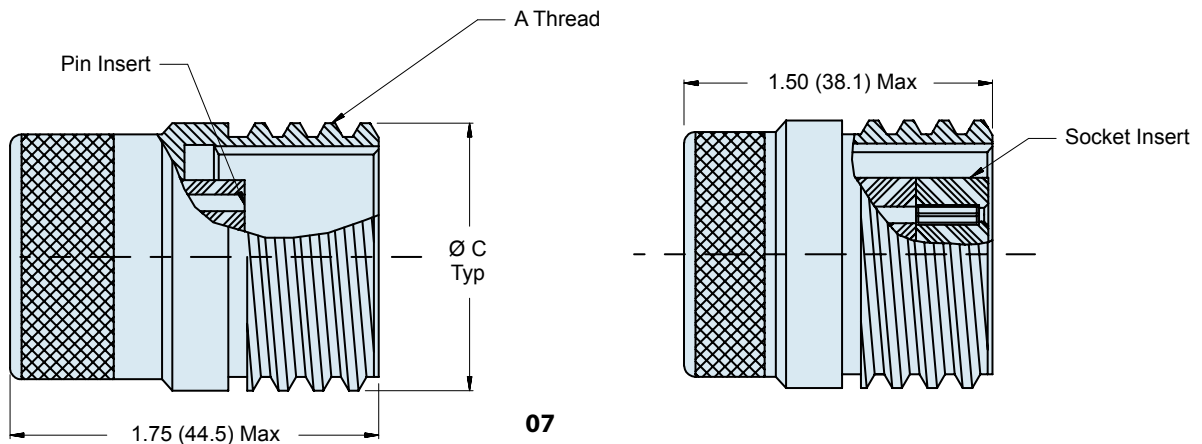
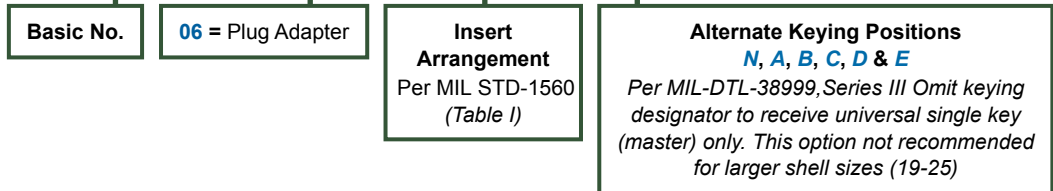
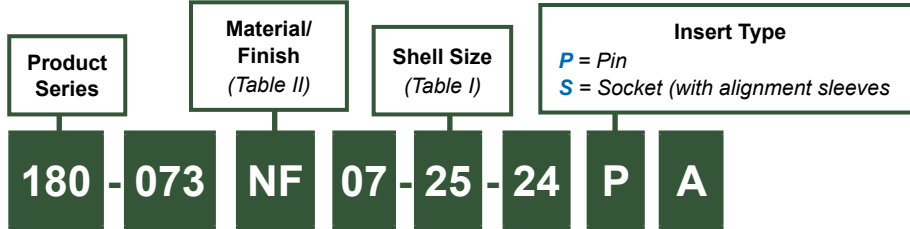




**180-073 (07)**  
**Fiber Optic Test Adapter, Receptacle**  
**With Special Insert Arrangement MIL-DTL-38999 Series III**

**MIL-DTL-38999 test adapter (receptacle)**

**How To Order**



**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**

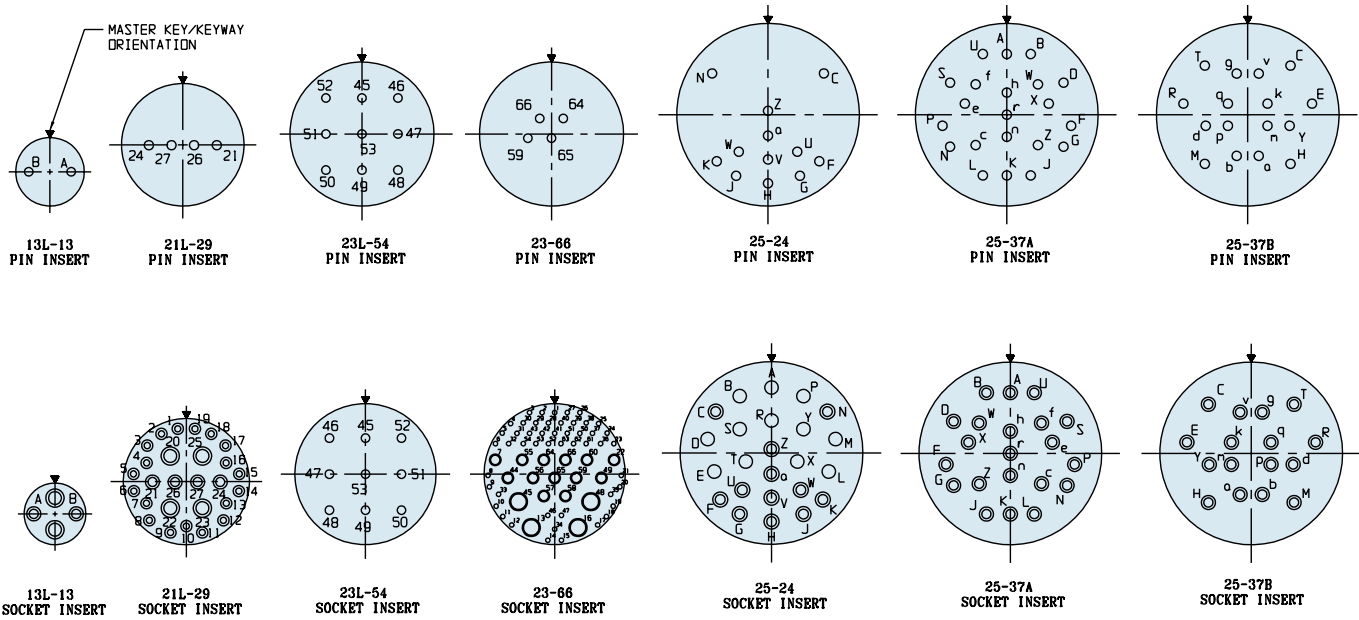
- For fiber optic test probe jumper, see Glenair drawing ABC54705
- For fiber optic test probe (low profile, probe-to-probe) jumper see Glenair drawing FO03187
- 25-37 insert cavity spacing too close to probe using one adapter. 2 adapters (25-37A and 25-37B) are required
- Shell size 23 for insert 23-66 only is made of 300 series stainless steel
- Cavity markings applied to rear insert face only

180-073 (07)  
**Fiber Optic Test Adapter, Receptacle**  
 With Special Insert Arrangement MIL-DTL-38999 Series III



Test Probes  
and Kits

**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	23L-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**

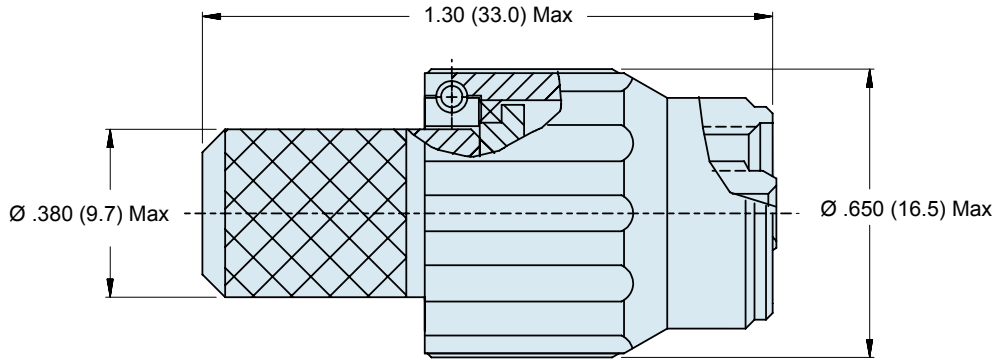
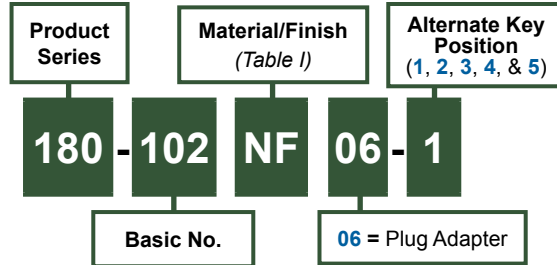
Code	Material	Finish
M	Aluminum Alloy	Electroless Nickel
NF		Cadmium, Olive Drab
Z1	Stainless Steel	Passivate



# 180-102 (06) Fiber Optic Probe Adapter, Plug

**Fiber optic plug probe adapter for use with 180-071 connectors**

**How To Order**



**06 Plug Adapter**  
U.S. PATENT NO. 5,960,137

**Table I: Finish**

Code	Material	Finish
C	Aluminum	Anodize, Black
M	Alloy	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

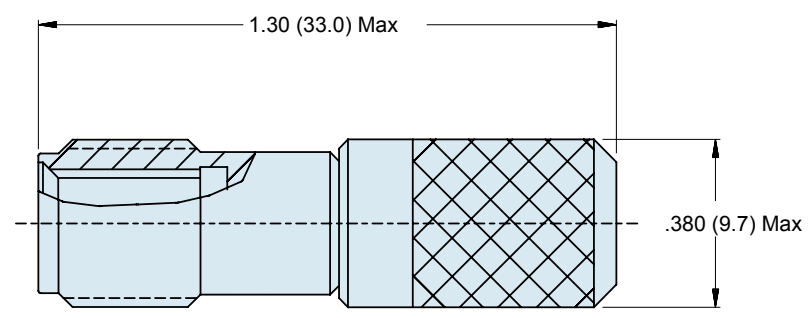
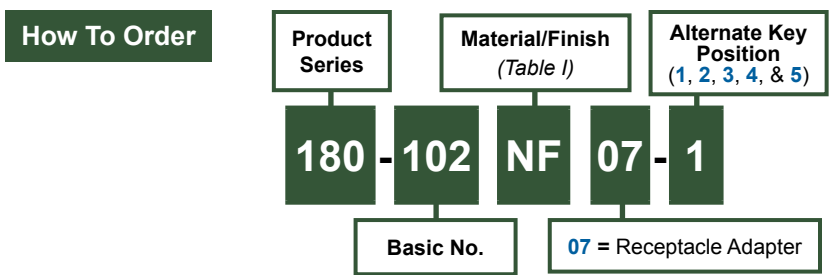
**Notes**

For fiber optic test probe jumper, see Glenair drawing ABC54705

# 180-102 (07) Fiber Optic Probe Adapter, Receptacle



## Fiber optic receptacle probe adapter for use with 180-071 connectors



**07 Receptacle Adapter**  
U.S. PATENT NO. 5,960,137

Table I: Finish		
Code	Material	Finish
C	Aluminum	Anodize, Black
M	Alloy	Electroless Nickel
NF	Aluminum	Cadmium, Olive Drab

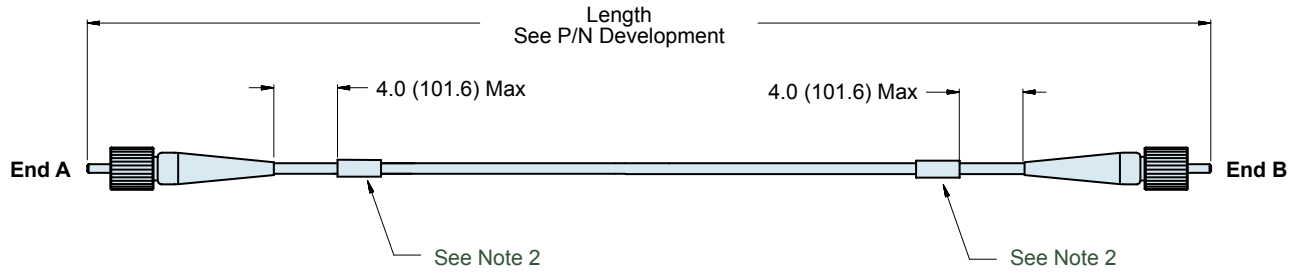
**Material and Finish**  
 Shell, Rear body: See Table I  
 Retaining Clips: Copper Alloy  
 Misc. Hardware: Stainless Steel  
 Seal: Fluorosilicone

**Notes**  
 For fiber optic test probe jumper, see Glenair drawing ABC54705





# FO1006 Fiber Optic Patch Cord Simplex



**FO1006 - 1 - 1 - XXXX - 09 A**

**Basic Number**

**Connector/Terminus Type**

- 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)**

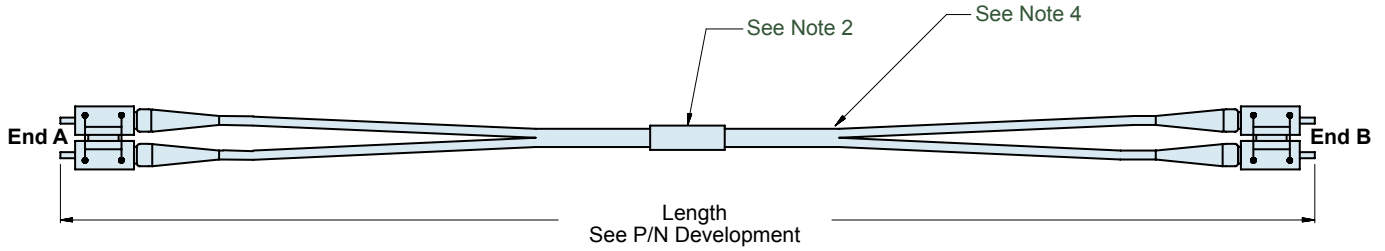
Standard Tolerance	
Length	Tolerance
5 in to 2 ft.	+1 in -0
2 to 10 ft.	+3 in -0
10 to 50 ft.	+6 in -0
50 to 100 ft.	+1 ft -0
100 ft. and up	+2 ft -0

### 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.

# FO1007 Fiber Optic Patch Cord Duplex



**FO1007 - 1 - 1 - XXXX - 09 A X**

**Basic Number**

**Connector/Terminus Type**

- 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**

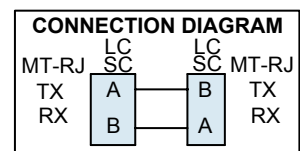
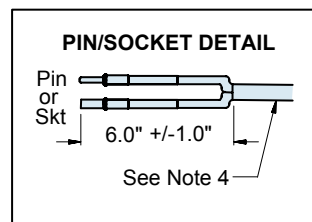
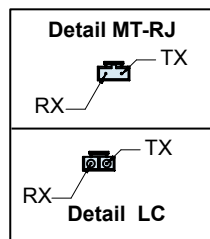
- A = -40°C to +85°C
- B = -55°C to +125°C
- C = Customer Specified (See Note 3)

**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 approx. 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 approx. 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.

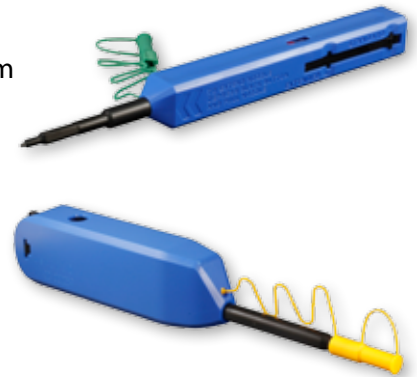


## Cleaning and troubleshooting instructions for critical fiber optic systems



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

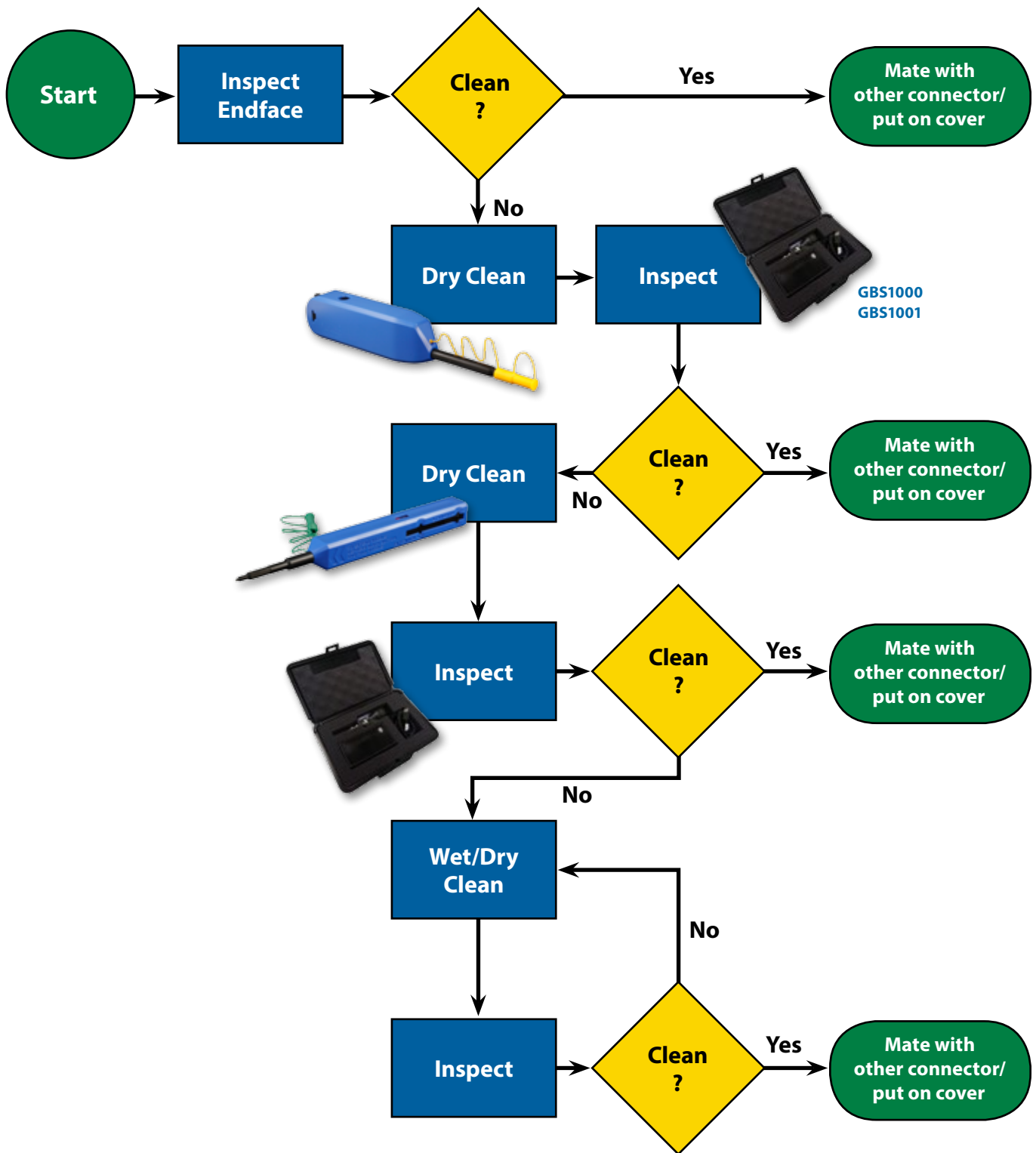
Visit our website at [www.glenair.com](http://www.glenair.com) or our youtube channel at [www.youtube.com/user/GlenairInc](http://www.youtube.com/user/GlenairInc) to see complete, easy to follow step-by-step video instructions to help you clean your fiber optic termini.

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.

# Fiber Optic Cleaning and Troubleshooting Process Flow



Test Probes  
and Kits





## 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



# 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





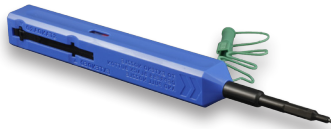
## Fiber Optic Cleaning and Troubleshooting Dry Action Cleaning Tools

### 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.

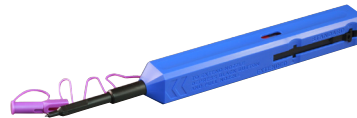
- A simple push motion engages tool
- Audible click when tool is fully engaged
- Durable—over 525 engagements per tool
- Crush resistant to over 250N
- Impact resistant to survive drops over 1.5M

#### Dry action cleaning tool for MIL-DTL-38999 system



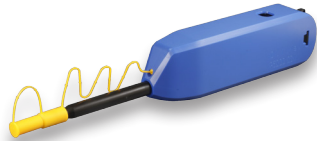
**GCLT - H160**

#### Dry action cleaning tool for GHD, NGCON, and ARINC 801 systems



**GCLT - H125**

#### Dry action cleaning tool for GFOCA system



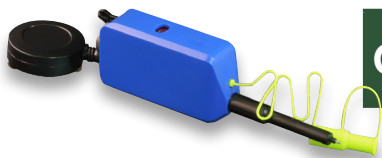
**GCLT - HC250**

#### Dry action cleaning tool for 2.0 mm MIL-PRF-28876 system



**GCLT - H200**

#### Dry action cleaning tool for D38999 #20 and Mighty Mouse #20HD systems



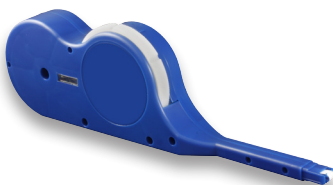
**GCLT - H100**

#### Dry action cleaning tool for SC, ST, and FC connectors



**GCLT - C250**

#### Dry action cleaning tool for MTP, MPO, MT (female and male) connectors



**GCLT - MPO**

#### 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



# Fiber Optic Cleaning and Troubleshooting Dry Action Cleaning Tools and Cleaning Swabs



Test Probes  
and Kits



## Dry Action Cleaning Tools for test adapters

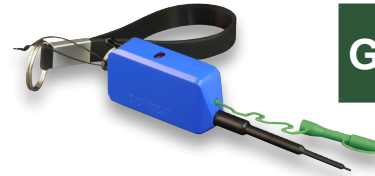
These dry action cleaning tools are configured for use with clean-through Glenair test adapters for GHD, NGCON, ARINC 801 and D38999 fiber optic connection systems.

### Dry action cleaning tool for GHD, NGCON, and ARINC 801 test adapters



**GCLT - HA125**

### Dry action cleaning tool for MIL-DTL-38999 test adapters

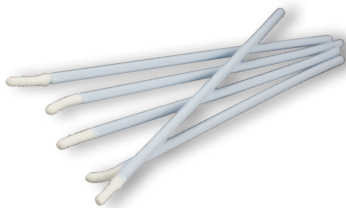


**GCLT - HA160**

## 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 cleotop - bag of 5 swabs



**187 - 021**

### Fiber optic cleaning swab 2.00 mm and 2.50 mm cleotop - 5 swabs/bag



**187 - 045**





**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.

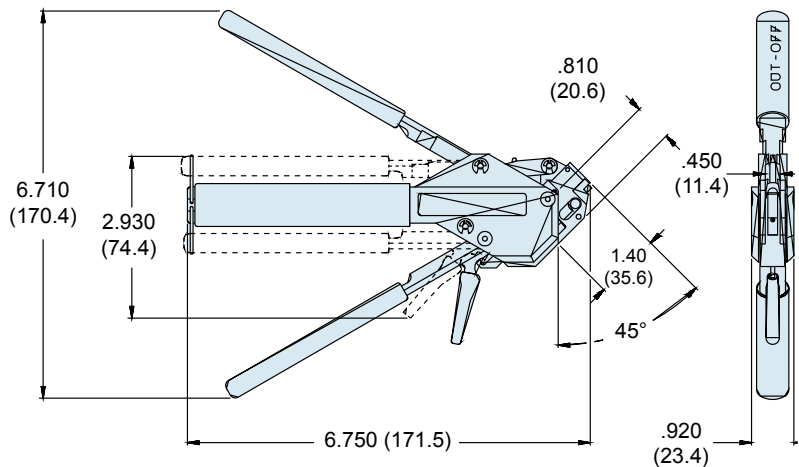


Manual Hand Tools

**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.

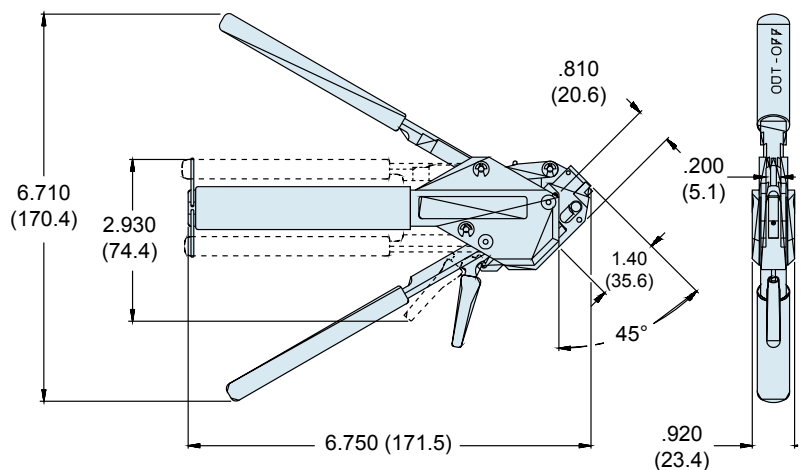
Reference: Band-Master™ ATS part number A40199.



**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.

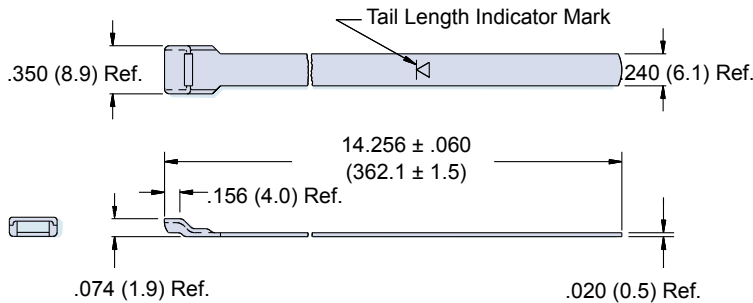


Metric Dimensions (mm) are indicated in parentheses.

**600-052, 600-057, 600-090, and 600-083**  
**The Band-Master™ ATS Clamping System**  
**Clamping Bands**



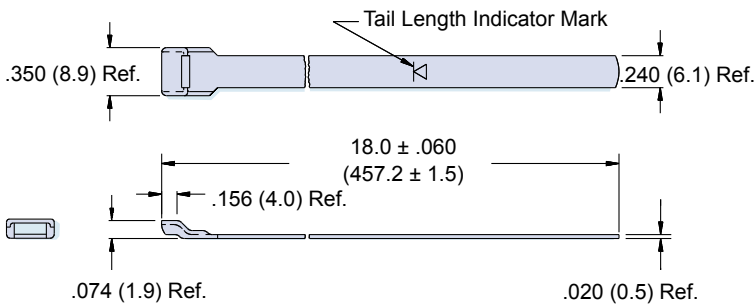
**Standard Band 600-052 and Precoiled Standard Band 600-052-1**



**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™ AT<sup>s</sup> Part Number A10086**

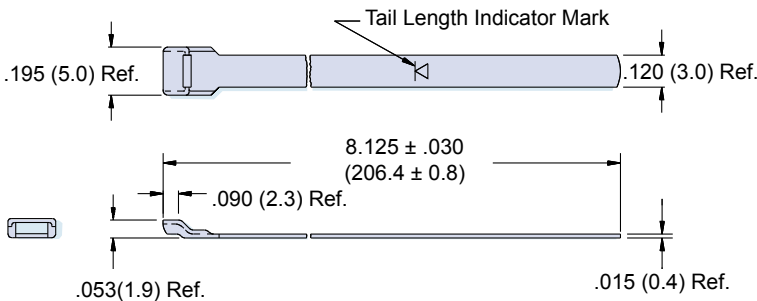
**Extended-Length Standard Band 600-090 and Precoiled Extended-Length Standard Band 600-090-1**



**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™ AT<sup>s</sup> Part Number A11086**

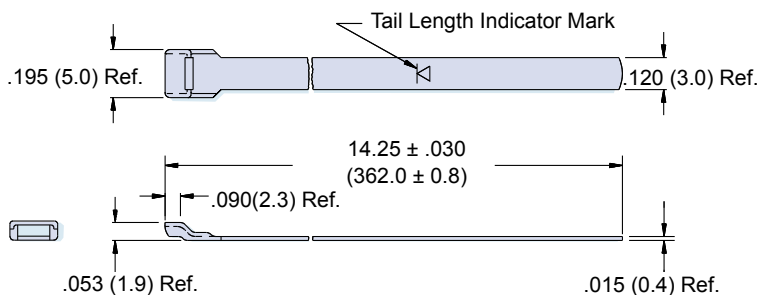
**Micro-Band 600-057 Precoiled Micro-Band 600-057-1**



**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™ AT<sup>s</sup> Part Number A31186**

**Extended Length Micro-Band 600-083 Precoiled Micro-Band 600-083-1**



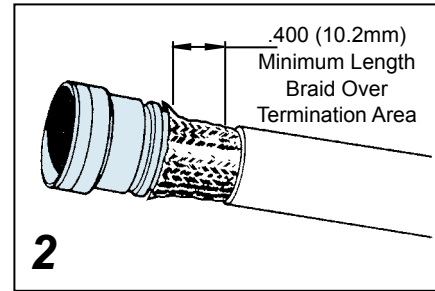
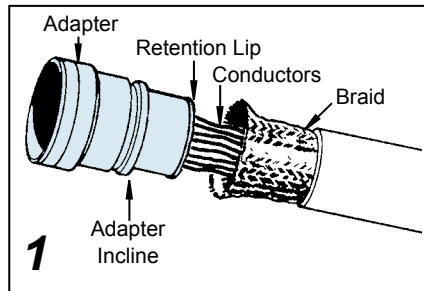
**The 600-083 Extended Length Micro-Band** is precision constructed of 300 Series SST/Passivate, and designed for use with the 600-061 Hand Banding Tool or the 600-068 Pneumatic Banding Tool. Double-wrapped bands will accommodate diameters up to approximately 1.88 inches (47.8). Bands may be ordered flat (600-083), or precoiled (600-083-1). Bands come bagged and tagged in quantities from 1 to 100.

**Reference: Band-Master™ AT<sup>s</sup> Part Number A31089.**

Metric dimensions (mm) are indicated in parentheses. Consult factory for diameters above 2.5 inches (63.5).

## 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.)

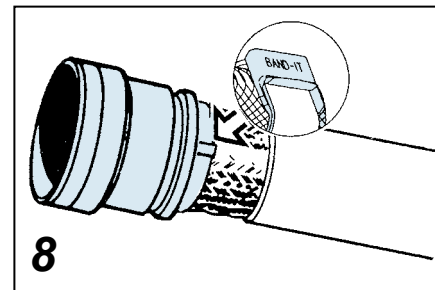
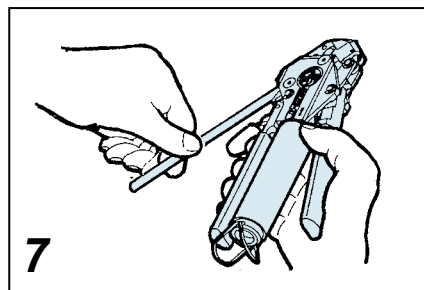
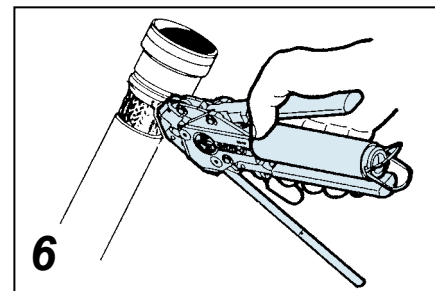
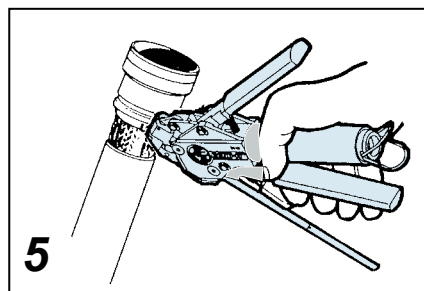
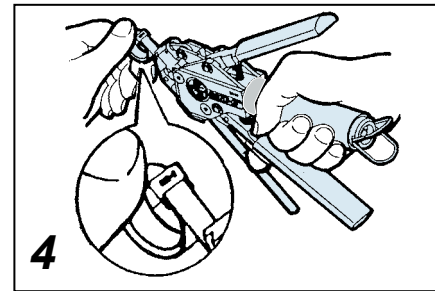
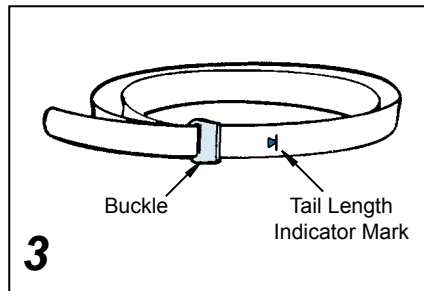
**B.** Pull on Band until Mark (▷) is within approximately .250 inch (6.4mm) of Buckle Slot (Figure 3). The Band may be tightened further if desired.

**NOTE: Prepared Band should have (▷) Mark visible approximately where shown in Figure 3.**

### Shield Termination Clamping Process (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.





## Glenair Fiber Optic Custom Tooling Request

### Which process do you want to perform?

- Repair, termination, cleaning, inspection, and testing
- Cleaning, inspection, and testing
- Cleaning and inspection
- Insertion and return loss
- Insertion loss test
- 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 interferometer 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: \_\_\_\_\_



### **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.

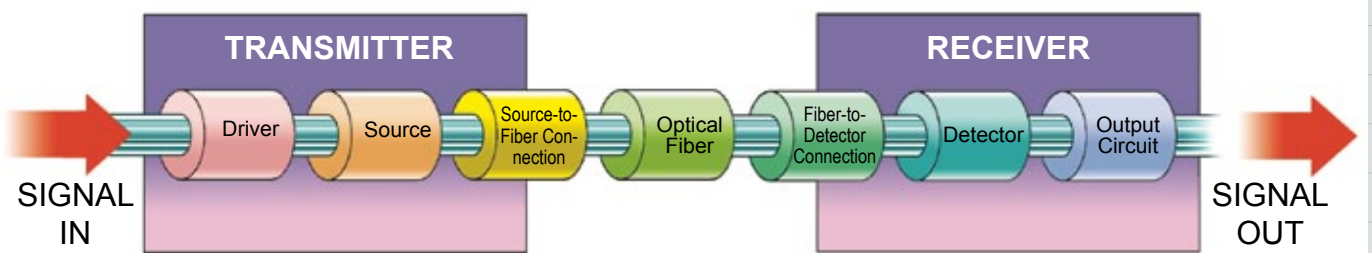
The "encoding" side of an optical communication system is called the transmitter. This is the place of origin for all data entering the fiber optic system. The transmitter essentially converts coded electrical signals into equivalently coded light pulses. A light-emitting diode (LED) or an injection-laser 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**

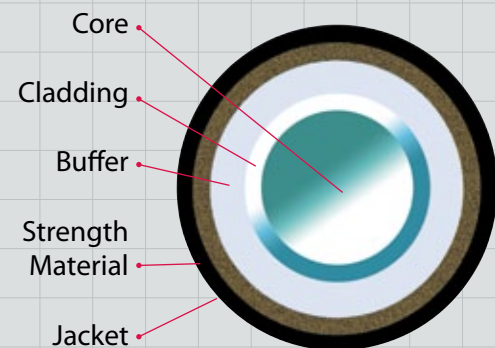
There are typically five elements that make up the construction of a fiber optic cable: the optic core, optic cladding, buffer, strength member and outer jacket. The optic core is the light-carrying element at the center of the optical fiber. It is commonly made from a combination of highly purified 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*



### Fiber Optic Cable Cross Section



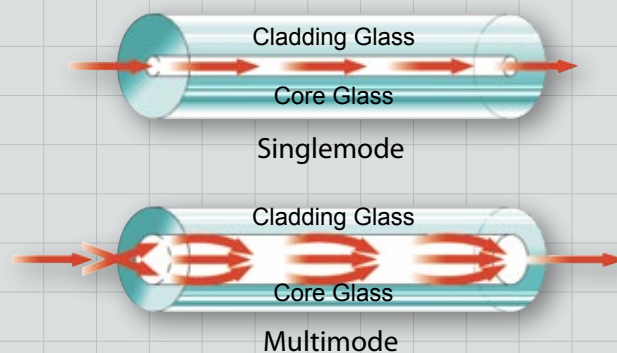
reflection possible, as the difference in materials used in the core and the cladding creates an extremely reflective surface at the point where they interface. Light pulses entering the fiber core reflect off the core/cladding interface and thus remain within the core as they move down the line.

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 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.

### 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 achieve 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

## 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.

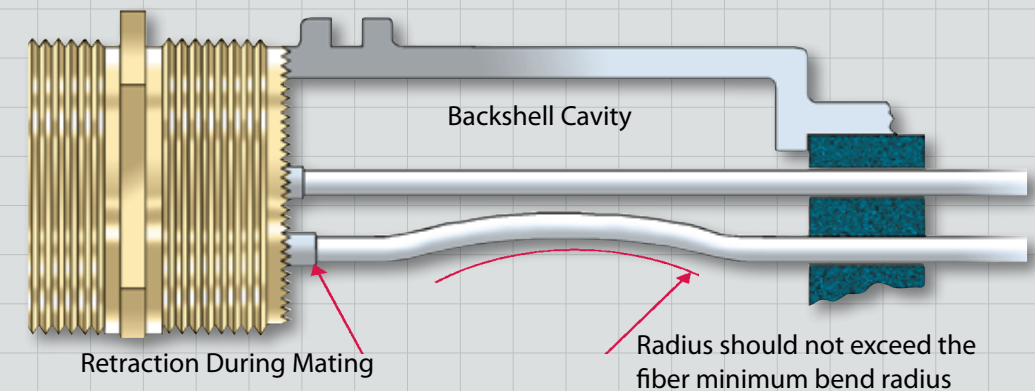
Glenair custom single and multichannel fiber optic connectors utilize the latest composite thermoplastic materials technology and are designed for use with Glenair's family of fiber optic connector accessories.

### 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

### 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.



(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:

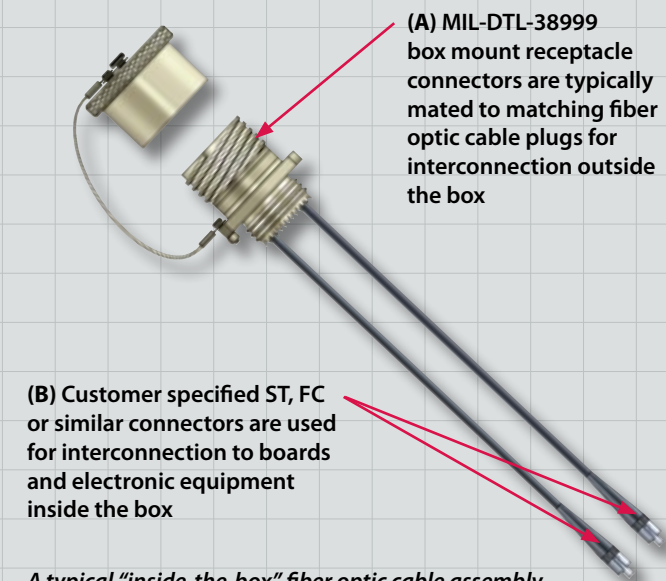
## Packaging Solutions for Inside the Box

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



(A) MIL-DTL-38999 box mount receptacle connectors are typically mated to matching fiber optic cable plugs for interconnection outside the box

(B) Customer specified ST, FC or similar connectors are used for interconnection to boards and electronic equipment inside the box

*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.*

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.

## 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



polymer-core conduit assemblies, and (3) Armored cable equipped with environmental and/or shield terminating backshells.

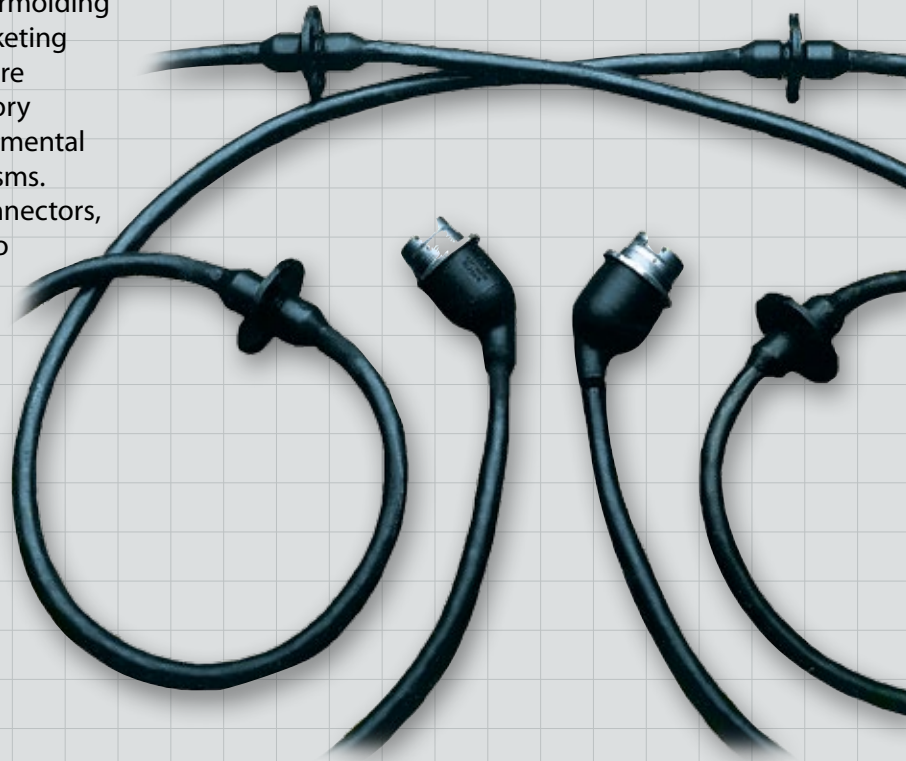
#### Overmolded Harnesses

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.*



*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.

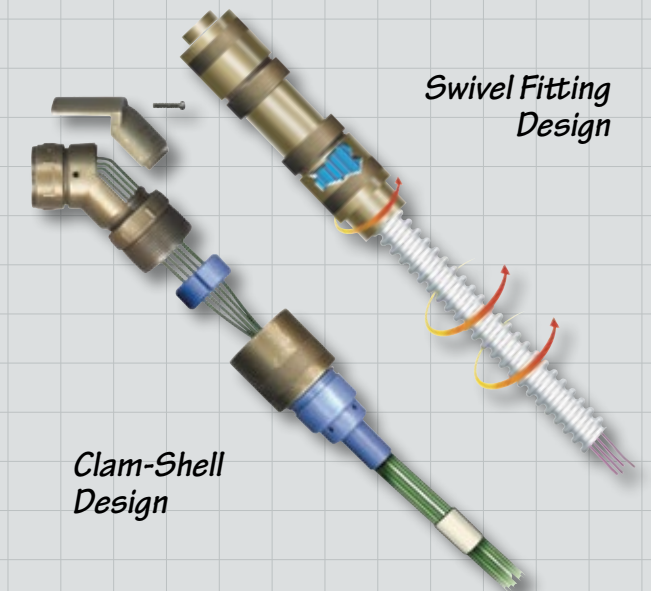
#### Reinforced Cable/Backshell Assemblies

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.*



### Packaging Solutions for Field Termination

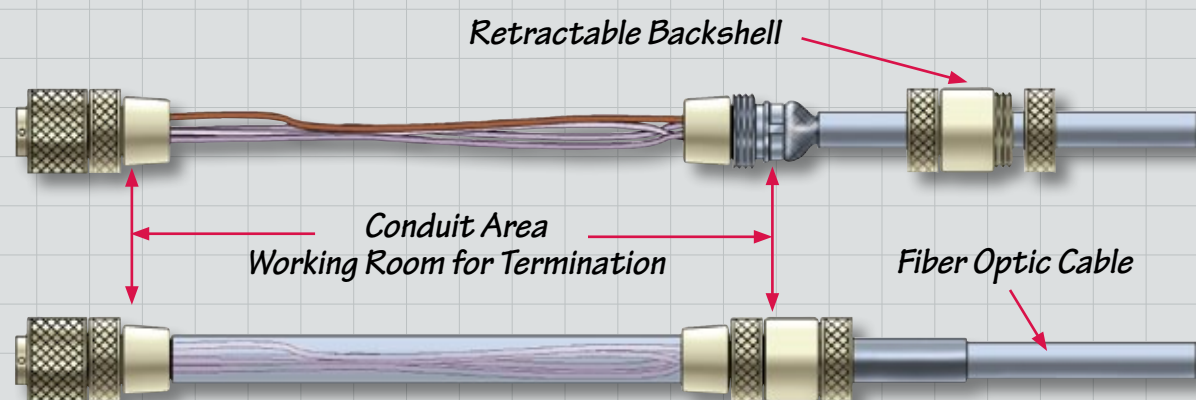
The third major packaging category for fiber optic interconnect applications covers those situations in which a pre-assembled cable or harness cannot be used due to the difficulty of cable installation and routing. A classic example is found in shipboard installation, where the fiber optic cable often 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.

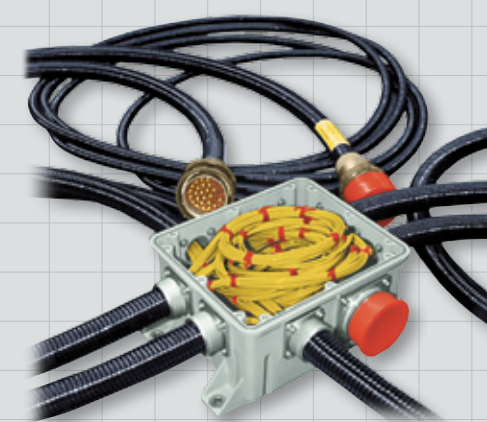
One solution to the problem is to mount a junction box at each end of the system and bring the trunk cable into the box for subsequent termination of the contacts and protection of the media. Such junction boxes also aid in the routing and storage

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.



## FIBER OPTIC APPLICATION EXAMPLES

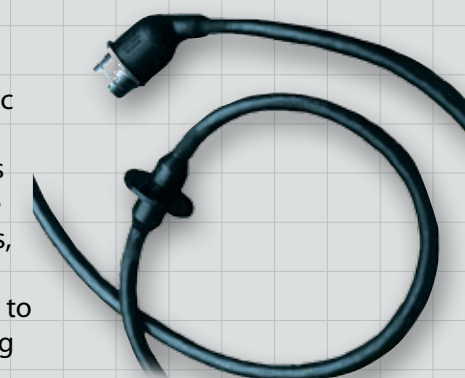


### Interconnect Junction and Media Storage

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.

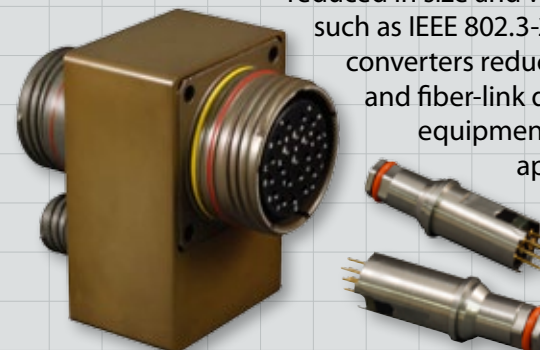
### Fly-by-Light

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 application 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.







## 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.

### 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

### 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/demating 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

## The Glenair Eye-Beam™ Fiber Optic Revolution



*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*





## The Glenair Eye-Beam™ Fiber Optic Revolution

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,

## The Glenair Eye-Beam™ Fiber Optic Revolution



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

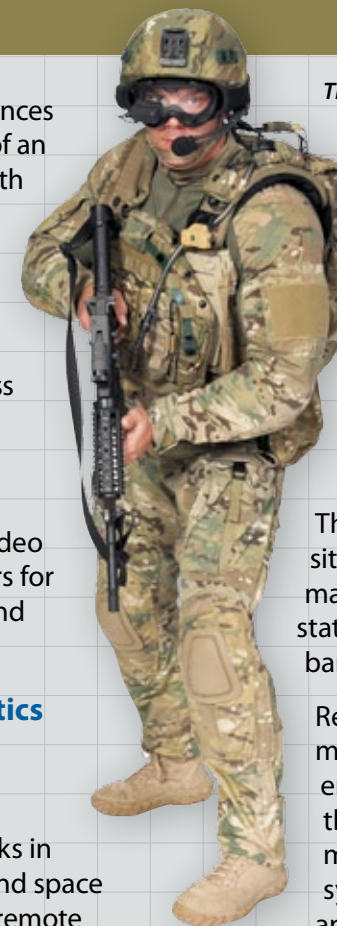
Robots are relied on in manufacturing and industry to do jobs in dangerous or dirty environments. They are also employed in increasingly complex tasks in bomb detection and disposal, earth and space exploration, laboratory research, and remote surgical systems. Glenair COTS (Commercial Off-The-Shelf) 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.





## 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.

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	GMF-002 Type II Class 1	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	GMF-002 Type II Class 3	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

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.



## 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
<b>A</b>	Aluminum, Cadmium Plated, Clear Chromate	<b>LF</b>
<b>B</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>
<b>C</b>	Aluminum, Anodize, Hardcoat	<b>G</b>
<b>E</b>	Stainless Steel, Passivated	<b>Z1</b>
<b>F</b>	Aluminum, Electroless Nickel Plated	<b>M</b>
<b>N</b>	Stainless Steel, Electrodeposited Nickel (Hermetic)	<b>ZL</b>
<b>P</b>	Aluminum, Pure Dense Aluminum (AlumiPlate <sup>SM</sup> )	<b>AL</b>
<b>R</b>	Aluminum, Electroless Nickel	<b>ME</b>
<b>T</b>	Aluminum, Nickel-PTFE	<b>MT</b>
<b>U</b>	Aluminum, Cadmium Plated, Clear Chromate	<b>LF</b>
<b>X</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>
<b>Z</b>	Aluminum, Black Zinc-Nickel	<b>ZR</b>

MIL-DTL-38999 Series III and IV Class Code	Material, Finish	Recommended Glenair Material/Finish Code
<b>C</b>	Aluminum, Anodize, Hardcoat	<b>G</b>
<b>F</b>	Aluminum, Electroless Nickel	<b>M</b>
<b>G</b>	Aluminum, Electroless Nickel (Space Grade)	<b>MA</b>
<b>H</b>	Stainless Steel, Passivated (Space Grade)	<b>Z1</b>
<b>J</b>	Composite, Cadmium Plated, Olive Drab	<b>XW</b>
<b>K</b>	Stainless Steel, Passivated	<b>Z1</b>
<b>L</b>	Stainless Steel, Electrodeposited Nickel	<b>ZL</b>
<b>M</b>	Composite, Electroless Nickel Plated	<b>XM</b>
<b>N</b>	Stainless Steel, Electrodeposited Nickel (Hermetic)	<b>ZL</b>
<b>P</b>	Aluminum, Pure Dense Aluminum (AlumiPlate <sup>SM</sup> )	<b>AL</b>
<b>R</b>	Aluminum, Electroless Nickel	<b>ME</b>
<b>S</b>	Stainless Steel, Electrodeposited Nickel	<b>ZL</b>
<b>T</b>	Aluminum, Nickel-PTFE	<b>MT</b>
<b>W</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>
<b>X</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>
<b>Y</b>	Stainless Steel, Passivated	<b>Z1</b>
<b>Z</b>	Aluminum, Black Zinc-Nickel	<b>ZR</b>

## Glenair Connector Plating Code and Mil-Spec Connector Finish Code Cross-Reference



MIL-DTL-28840 Finish Code	Material, Finish	Recommended Glenair Material/Finish Code
<b>A</b>	Aluminum, Cadmium Olive Drab over Nickel	<b>NF</b>
<b>B</b>	Stainless Steel, Cadmium-Black over Nickel	<b>ZU</b>
<b>L</b>	Aluminum, Nickel PTFE	<b>MT</b>
<b>S</b>	Aluminum, Zinc Nickel, Non-Reflective	<b>ZR</b>

SAE AS5015 Class Code	Material, Finish	Recommended Glenair Material/Finish Code
<b>A, B, C, D, E, DJ, F, P, R, W</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>
<b>H, K</b>	Stainless Steel, Electroless Nickel	<b>ZM</b>
<b>L, U</b>	Aluminum, Electroless Nickel	<b>M</b>

MIL-DTL-26482	Material, Finish	Recommended Glenair Material/Finish Code
<b>Series I</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>
<b>Series 2 Class L</b>	Electroless Nickel	<b>M</b>
<b>Series 2 Class W</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>

AS85049 Finish Code	Material, Finish	Recommended Glenair Material/Finish Code
<b>A</b>	Aluminum, Black Anodize	<b>C</b>
<b>B</b>	Stainless Steel, Cadmium Plated, Black	<b>ZU</b>
<b>G</b>	Aluminum, Electroless Nickel Plated (Space)	<b>M</b>
<b>J</b>	Composite, Cadmium Plated, Olive Drab	<b>XW</b>
<b>L</b>	Composite, Cadmium Plated, Olive Drab <sup>(1)</sup>	<b>XX</b>
<b>M</b>	Composite, Electroless Nickel Plated	<b>XM</b>
<b>N</b>	Aluminum, Electroless Nickel Plated	<b>M</b>
<b>P</b>	Aluminum, Cadmium Plated, Olive Drab <sup>(1)</sup>	<b>NFP</b>
<b>W</b>	Aluminum, Cadmium Plated, Olive Drab	<b>NF</b>
<b>T</b>	Composite, Unplated	<b>XO</b>

(1) Selective plated with polysulfide barrier



# 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.

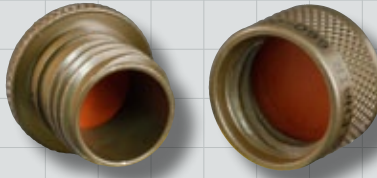


## Zinc-Nickel

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.

M



## Quick Picks: A Guide to Glenair's Most Popular Materials and Finishes



### Black Anodize

Cost	\$	\$	\$	\$	\$
Conductivity	+	+	+	+	+
Corrosion Resistance	⌚	⌚	⌚	⌚	⌚
-65 to +175°C					
Glenair Code <b>C</b>					

**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 <b>XM, XW, XMT</b>					

**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 <b>XB, XO</b>					

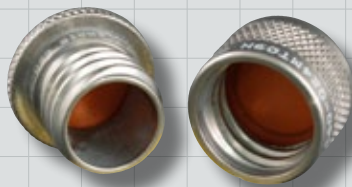
**RoHS Compliant** If conductivity and EMI shielding are not required, unplated composites provide the best solution to corrosion protection. Glenair's composite connector accessories are ideally suited for use in harsh environments where even stainless steel parts can be attacked by corrosive fluids. Available in black (code XB) and brown (code XO).



### AlumiPlate<sup>SM</sup>

Cost	\$	\$	\$	\$	\$
Conductivity	+	+	+	+	+
Corrosion Resistance	⌚	⌚	⌚	⌚	⌚
-65 to +175°C					
Glenair Code <b>AL, XAL</b>					

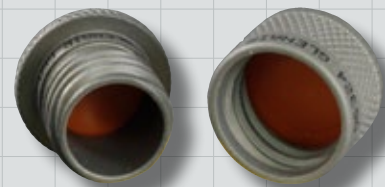
**RoHS Compliant** AlumiPlate provides excellent conductivity and corrosion resistance. 99.99% pure aluminum is electrolytically deposited onto aluminum or composite in a specialized water-free process, followed by a trivalent chromate conversion coating. AlumiPlate has been approved by Boeing and Lockheed 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 <b>MT, XMT, ZMT</b>					

**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 <b>G</b>					

**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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ВЧ соединители, коаксиальные кабели,  
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