



Fiber Optic Interconnect Solutions

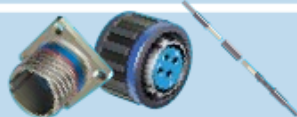
Tactical Fiber Optic Connectors, Cables and Termini

United States ■ United Kingdom ■ Germany ■ France ■ Nordic ■ Italy ■ Spain ■ Japan

Fiber Optic Interconnect Solutions



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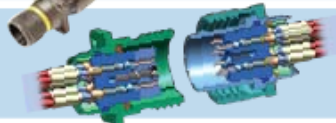
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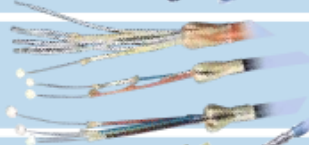
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Six Reasons to Upgrade to Fiber Optics:



1. Reduced Weight

Compared to copper, optical fiber is relatively small in size and light in weight—a major advantage in interconnect systems servicing airborne avionics. 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.

2. Reduced Size

Fiber media is also significantly smaller than copper. This reduction in size makes it possible to run multiple backup cables for each electronic system or device. The ability to provide complete redundancy for all critical cabling is a major motivating factor driving the use of fiber optics in mission-critical systems.

3. EMI Immunity

Optical fiber is particularly useful 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.

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.

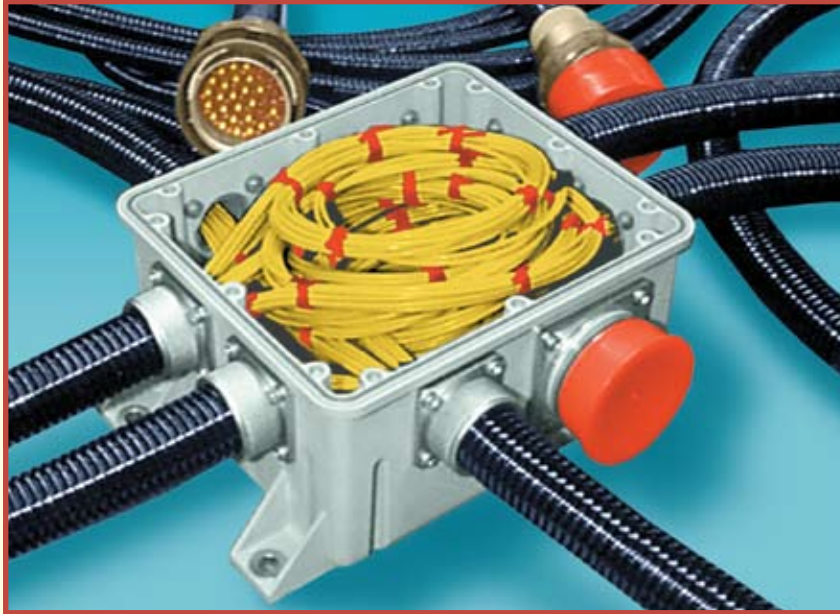
5. Enhanced Security

This characteristic also provides for enhanced transmission security, as light pulses, unlike electrical signals, are almost impossible to intercept or monitor.

6. Huge Bandwidth

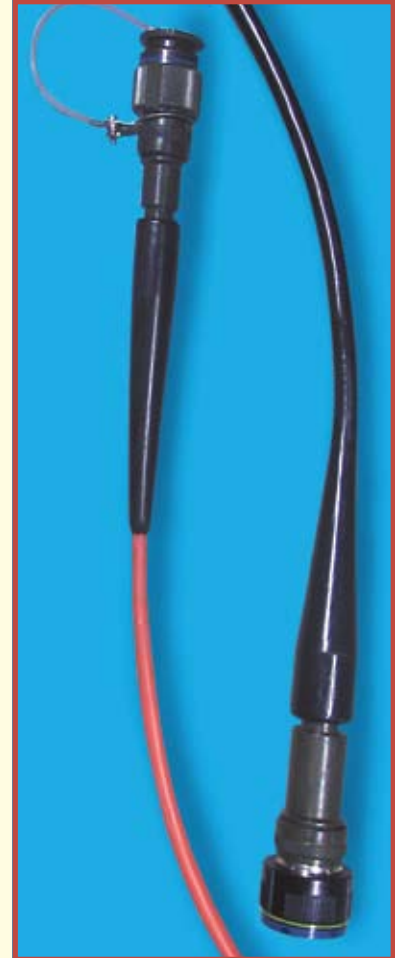
Fiber can transmit a mind-boggling quantity of data with extremely good transmission quality. Two strands of optical fiber, both no thicker than a human hair, can transmit the equivalent of 24,000 telephone calls simultaneously. By way of comparison, two strands of copper wire can transmit but a single phone conversation—in a much heavier and larger cable. The smaller and lighter fiber strand has over 150 times the data carrying capacity of the bulkier copper cable! Additionally, data is typically transmitted digitally (the natural form for computerized equipment) which reduces translation errors and bottlenecks. Simply put, fiber can transmit signals over the longest distance at the lowest

Weight and Space Saving Fiber Optic Packaging



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.

Harsh Environment

Fiber optic communications technology needs to be able to withstand heat, cold, rain and other environmental abuse—that is if it is intended to survive in exposed applications such as office roof-tops and utility poles. This Glenair overmolded cable assembly provides Singlemode transmission and reception for a "last-mile" wireless fiber optic radio network. The cable interconnects roof-top transmission equipment to backend networking equipment to provide flawless data transmission.

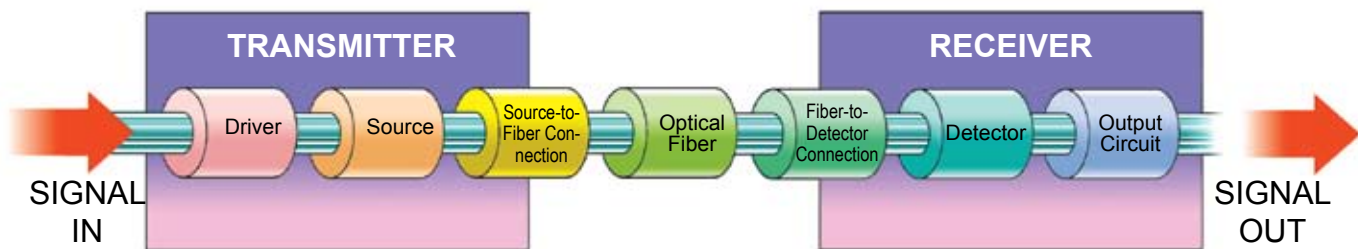
Fiber Optic Operation

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 both lighter, smaller and safer. Fiber optics, combined with satellite and other broadcast media, represents

of the actual light pulses. Using a lens, the light pulses are funnelled 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” ele-



Basic Fiber Optic Link

the new world order for both commercial telecommunications as well as specialized applications in avionics, robotics, weapon systems, sensors, transportation and other high performance environments.

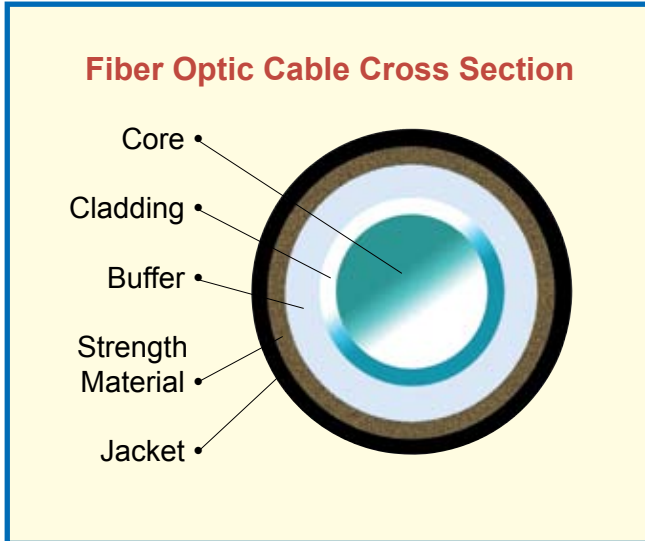
Functionally, fiber optic systems are similar to the copper wire systems they are rapidly replacing. The principle difference is that fiber optics use light pulses (photons) to transmit data down fiber lines, instead of electronic pulses to transmit data down copper lines. Other differences are best 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

ment 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 reflection possible, as the difference in materials used in the core and the cladding creates an extremely reflective surface at the point in which 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.

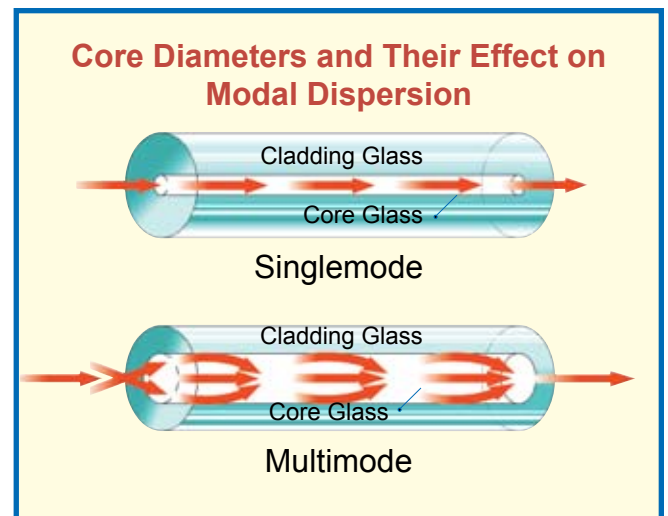
Surrounding the cladding is a buffer material which acts as a shock absorber to protect the core and cladding from damage. A strength member, typically Aramid, surrounds the buffer adding critical tensile strength to the cable to prevent damage from pull forces during installation. The outer jacket protects 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.

Singlemode fibers are manufactured with the



smallest core size (approximately 8 - 10 μm 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

Introduction to Fiber Optic Interconnect Technologies and Packaging Military Standards

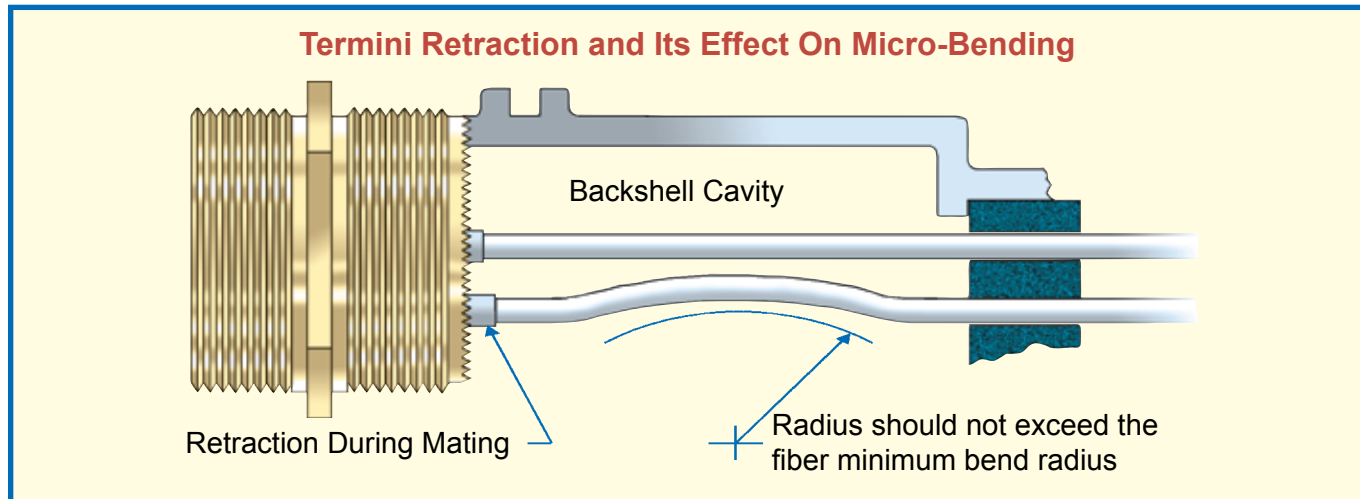
critical concern in interconnect applications which expose the polished ends of the fibers to debris during connector mating and unmating.

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

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



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

termini, special purpose backshells and other accessories is similarly controlled by existing packaging requirements and interconnect industry dimensional standards.

High-Reliability Connectors

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.

Such connectors also have a bottoming surface design for reliable shell-to-shell bottoming. This 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 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.

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.



Introduction to Fiber Optic Interconnect Technologies and Packaging Fiber Optic Backshells

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 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

Fiber Optic Terminology:

(Continued from Page 7)

Decibel (dB)

Unit for measuring the relative strength of a signal.

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.

Misalignment Loss

The loss of power resulting from axial misalignment, lateral displacement, and end separation.

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, terminations, receivers and so on needed for integrating optical fiber into an existing electronic system.

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.

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Fiber Optic Terminology:

(Continued from Page 8)

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.



Introduction to Fiber Optic Interconnect Technologies and Packaging Packaging Options

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 figure 1). Rugged, environmental applications, such as a weapon interconnect cable intersecting a fuel tank may require more ruggedized cable construction (figure 2).

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 figure 1: a wall mount or jam nut mount receptacle connector ("A") with simplex fiber leads. This receptacle connector is used to penetrate the enclosure and mate to the external environmental plug connector.

The simplex leads within the protected enclosure commonly route to the transceiver optical device, and are terminated to common commercial connectors such as ST, FC, SC, LC (or other) connectors at the "B" end.

Glenair can also supply pigtail assemblies of this type with a "FiberCon" backshell and/or a protective length of conduit. This design approach ensures strict alignment of the fiber strands to the connector, optimum strain relief to

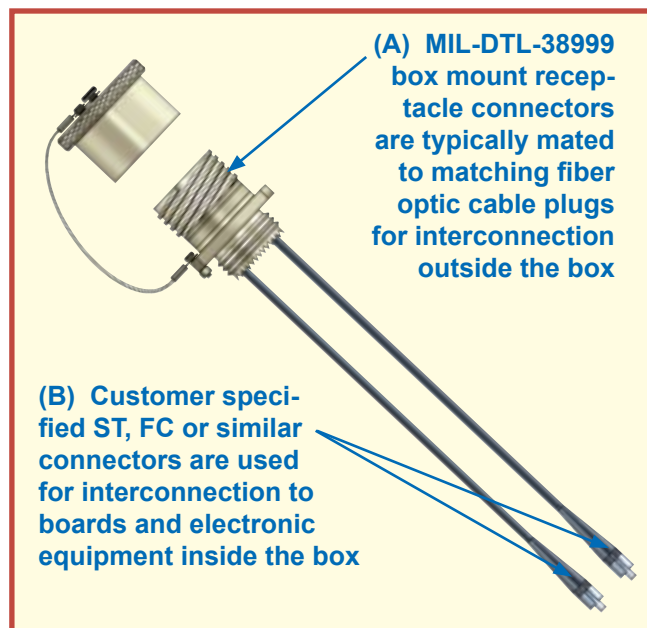
the individual fibers as well as crush protection.

The use of a short length of conduit and a small end-bell fitting is recommended in applications where a heat or abrasion source within the box may damage the fiber media. In most cases, analysis of the available space is critical to ensure such interconnect hardware does not interfere with the electronics package inside the box. This basic packaging is appropriate for any equipment—such as a radar, camera, shipboard console, antenna and so on—with an internal fiber wire servicing an optical transmitter/receiver.

Glenair can supply the complete interconnect assembly, including the connector, termini, fiber, optional backshell fittings and conduit. Glenair's ASAP Fiber Optic Cable Sets are specifically designed for applications of this type.

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



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.

Introduction to Fiber Optic Interconnect Technologies and Packaging *Packaging Options*



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.

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.

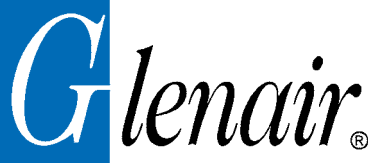
Packaging generally takes three forms: (1) Overmolded cable harnesses, (2) Metal-core or polymer conduit assemblies, and (3) Armored cable equipped with environmental and/or shield terminating backshells.

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



Introduction to Fiber Optic Interconnect Technologies and Packaging Packaging Options



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.

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.

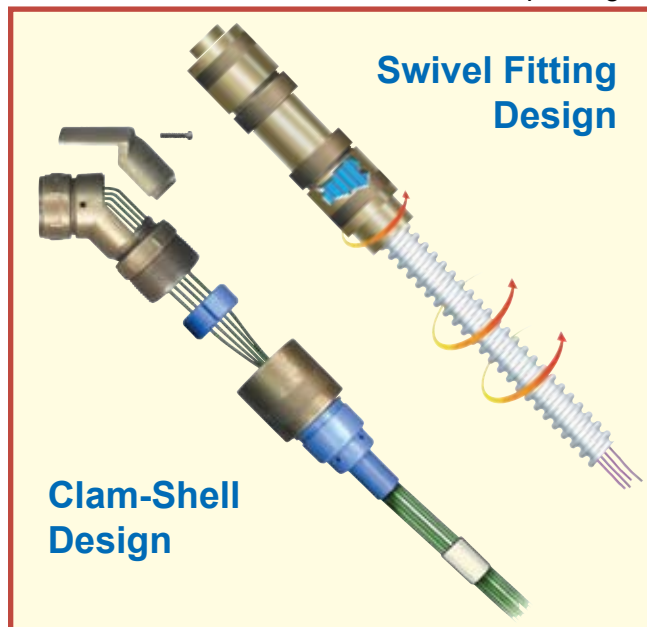
Glenair offers complete in-house capabilities for the construction of fiber optic conduit assemblies. In addition to helically molded polymer materials, we also offer a metal-core conduit product which provides unmatched crush-resistance and EMI protection (for hybrid copper/fiber applications). Both 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 reparability to the assembly. Unlike overmolded solutions, the reinforced extruded cable/backshell package



The fiber optic backshell pictured 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.

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.

Packaging Solutions for Field Termination

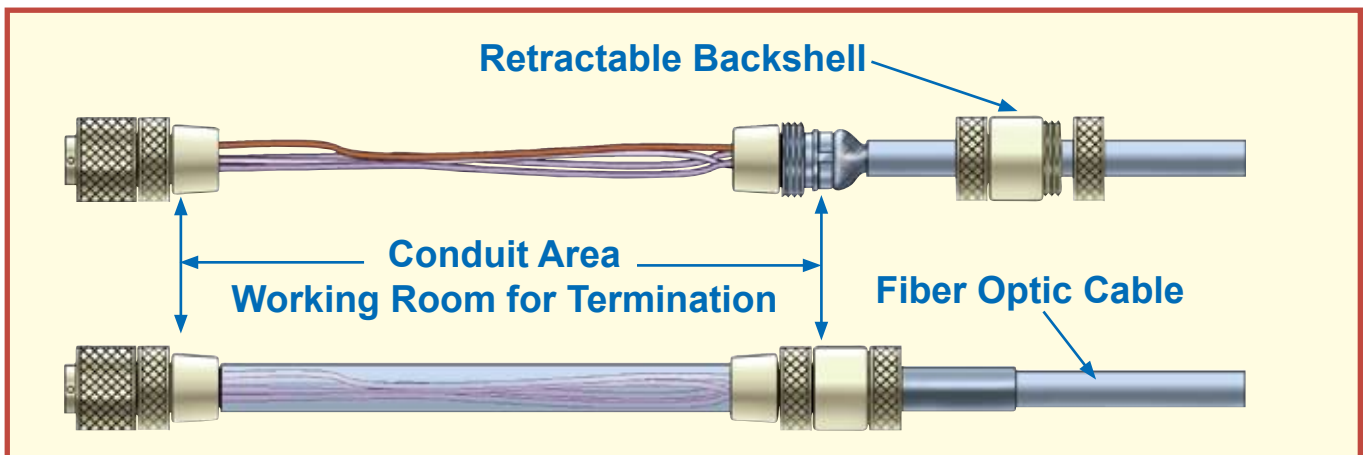
The third major packaging category for fiber optic interconnect applications covers those situations in which a pre-assembled cable or harness cannot be used due to the difficulty of cable installation and routing. A classic example is found in shipboard installation, where the fiber optic cable often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





Expanded Beam Fiber Optic Connectors and Cables for Harsh Application Environments

Industry Leaders in Expanded Beam Fiber Optic Connectors and Cables for Harsh Application Environments

Fiber optic and hybrid fiber/electric interconnect systems are now deployed in an increasingly wide range of commercial and military applications in sea, air, land and space. Fiber optic media is ideally suited for harsh applications where attention to electromagnetic interference, bandwidth, distance, size, and weight are critical requirements. From traditional butt joint connectors to the most advanced expanded beam interconnect systems, Glenair fiber optic solutions are perfectly suited for tactical military and other harsh weather, temperature and mating cycle applications.

STRATOS Lightwave™ Expanded Beam Technology Inside

Glenair Expanded Beam Fiber Optic Connectors use proven STRATOS Lightwave™ Technology for advanced optical and environmental performance.

STRATOS Lightwave™ produces a broad range of integrated active/passive optical modules and fiber optic interconnect components, including advanced expanded beam fiber



optic technologies for use in harsh application environments.

STRATOS Lightwave™ technology achieves superior optical performance due to the company's expertise in the laser shaping of the critical optical lens componentry. In addition, the STRATOS sealed optical alignment system provides superior protection from water, mud, dust, oil and other contaminants.

Glenair is pleased to offer the complete range of STRATOS Lightwave™ expanded beam fiber optic technologies as the latest addition to our full-spectrum line of fiber optic interconnect solutions. Combined with our mil-qualified MIL-PRF-29504 termini and MIL-DTL-38999 type fiber optic connectors, Glenair now provides an industry-leading range of tactical fiber optic interconnect systems.



Expanded Beam Vs. Physical Contact Connectors

Physical Contact



Physical contact fiber optic connectors utilize butt-joint type contacts called termini. Mating pairs of termini may be integrated into virtually any connector shell design. The polished mating faces provide extremely low-loss transmission of optical signals but are best suited to clean and controlled environmental applications.

Expanded Beam



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

Expanded Beam Fiber Optic Connectors and Cables for Harsh Application Environments



Sealed Expanded Beam Technology Eliminates Data Loss From Environmental Contaminants, Rough Handling and Repetitive Mating Cycles

Commercial and military customers, such as those engaged in geo-physical exploration, mass-transit and tactical warfare now depend on optical interconnect technology due to its many advantages over electrical transmission systems.

Sealed expanded beam interconnect technologies prevent water, mud, dust, oil and other chemicals from contaminating the optical path and deteriorating system performance. Glenair expanded beam fiber optic connectors and cables, now with STRATOS Lightwave™ Technology, are available in a wide range of shell sizes, fiber types, and hybrid optical/electrical configurations.

Material choices, including aluminium and aluminium bronze shells, neoprene boots and grips, and conductive surface finishes—including cadmium-free options—are available throughout the line.



Series 185-HMA Hybrid Connectors and Cables



The Glenair 185-HMA connector series is a miniaturized hybrid connector suited for a vast array of applications. The innovative design ensures its ability for deployment in the toughest environments where high performance, total reliability and reduced package size are critical.

Benefiting from Stratos expanded beam technology, the precision optical alignment system creates immunity from water, mud, dust oil and other contaminants.

Hermaphroditic coupling eliminates the need for adaptors and male and female mating halves. Hermaphroditic housings also allow for rapid deployment, creating low loss Singlemode, Multimode and Hybrid "daisy- chained" links in a variety of insert arrangements ranging from simplex fiber to a copper hybrid.

The 185-HMA is ideally suited for environmental extremities where low maintenance and quick repairability is necessary. Connectors and cable assemblies are field installable and repairable.



Expanded Beam Fiber Optic Connectors and Cables for Harsh Application Environments

Series 185-900 Hermaphroditic Expanded Beam Connectors & Cables



Our Series 185-900 Hermaphroditic Expanded Beam Connectors are designed for deployment in the toughest applications where high performance and total reliability are critical.

Benefiting from Stratos expanded beam technology, the precision optical alignment system creates immunity from water, mud, dust, oil and other contaminants which can penetrate the optical path and rapidly deteriorate data transmission performance in field environments.

The 185-900 Series Hermaphroditic design eliminates the need for adaptors and male and female mating halves. Hermaphroditic housings allow for rapid field deployment, creating low loss singlemode, multimode or hybrid "daisy- chained" links.

Ideally suited for environmental extremities where low maintenance and quick reparability is necessary, the connectors are uniquely field installable, field repairable, and are available in a broad range of multi-channel configurations including bulkhead feed throughs and spooled cable sets.

A variety of shell materials make this series suitable for use in extreme arctic marine environments as well as in high heat desert or jungle conditions. Core features include:

- Two or Four Fiber Channels
- Singlemode or Multimode
- 2 + 2 Hybrid Configuration
- Multiple Wavelength Capability

Rapid "Daisy-Chaining" of Tactical Fiber Cables

Field deployment of fiber optic cable sets depends on simple, low-loss coupling technologies. Both tactical military and commercial applications rely on rapid, trouble-free deployment of interconnect cabling. Glenair hermaphroditic expanded beam connectors and cables are the perfect solution for frequent mating and unmating of fiber optic cabling in harsh application environments. The sealed 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.



**Expanded Beam
Fiber Optic Connectors and Cables
for Harsh Application Environments**



**Series 185-960 "Eurocomm Type II"
Tactical Military Connectors and Cables**

The Glenair "Eurocomm Type II" connector, specified within NATO and the German Military, benefits from STRATOS expanded beam technology. With over 10 years service, the Eurocomm is the favoured military solution, providing reliable performance in hostile environments. Hermaphroditic housings allow simple deployment, creating low loss singlemode and multimode "daisy-chained" links.

**Hermaphroditic Connectors
Offer Rapid Deployment Without
the Use of Male and Female
Mating Halves or Other Adapters**

A broad range of multi-channel configurations including bulkhead feed throughs are available in a variety of shell materials, making the 185-960 Series suitable for use in extreme environments—from arctic marine to the most hostile of desert conditions. Custom cable assemblies are a speciality.



**SPLICE Units and
Termination Kits Provide
Permanent In-Field Repair of
Fiber Media Without Power**

Announcing the SPLICE™: a low cost, field- tested approach to cable assembly repairs in the toughest of environments. The Glenair supplied kit is ready for use in a rugged field-usable carry case. SPLICE™ units, spares and consumables are easily inventoried and replenished for ongoing use. Best of all, there is no need for power, heat or complicated termination procedures: a simple cleave and polish achieves a typical figure of 1.0dB. Cable retention and tie-off is achieved through the aramid yarn and is IP67 guaranteed. The SPLICE™ Termination and Repair Kit includes:

- ***Complete range of tools for termination of both singlemode and multimode fiber cables.***
- ***Pre-formed plastic foam inserts to secure tools and spares and to provide rapid visual check of kit contents.***
- ***Internal document compartment for the storage of work instructions and manuals.***



Let Us Help You Convert to Fiber Optics Application Checklist

Originator Contact Information

Contact Name and Title _____

Company Name/Division _____

Street Address _____

City and State/Province _____

Country and Postal Code/Zip _____

Telephone _____ Fax _____ Email _____

Name of Project or Program: _____ Description: _____

Initial Quantity: _____ Required Delivery Date: _____ Potential Long-term Quantity: _____

Cable Specifications

Fiber Size (Multimode)

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

Fiber Size (Singlemode)

- 9/125 μm
- Other _____

Cable Construction

- Simplex
- Multichannel/No. of Fibers: _____
- Hybrid Fiber & Electrical
- Electrical Requirements:
 - Overall Shield: Yes No
 - Wire Size: _____ AWG
 - No. of Wires: _____

Temperature Requirements:

Operating: - °C ____ +°C ____

Storage: - °C ____ +°C ____

Optical Performance:

- < .5 dB
- < 1.0 dB

Is Return Loss (Back Reflection) a Concern?

- Yes No
- If Yes, Specify Desired Performance Value: _____ dB

Operating System Wavelength

- 850 nm
- 1300 nm
- 1550 nm

Application Specifications

Intended Use

- Avionics/Airframe
- Shipboard
- Ground Support
- Rail/Mass Transit
- Space
- Missile Defense
- Telecommunications
- Other _____

Cable Installation

- Internal-to-Equipment
- 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

Assembly Length Requirements

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

Special Considerations

- Weight Reduction Required
- Field Repairability Required
- Size or Shape Restraints as Specified: _____

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

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

Let Us Help You Convert To Fiber Optics

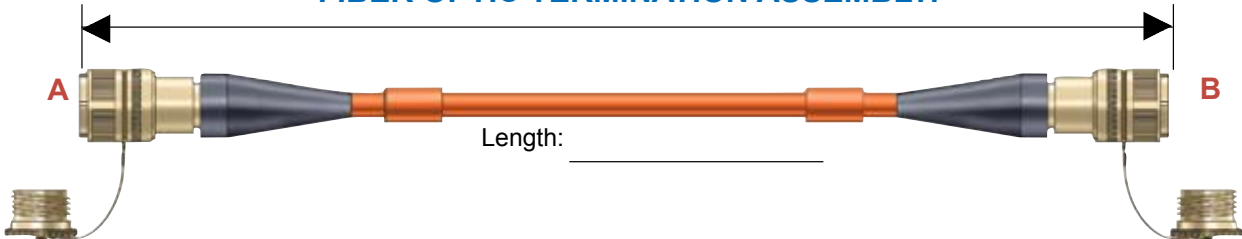
Application Checklist



The Application Checklist forms on this page and on page 18 (left) has been provided to serve as an initial guide to assist you with the specification of Glenair fiber optic cable assemblies or harnesses. After copying the form and filling in the appropriate

blanks, please feel free to fax or mail the completed forms to your local Glenair engineering/sales representative, or directly to the Glenair factory for a quote. Should additional information be required, we will contact you.

FIBER OPTIC TERMINATION ASSEMBLY:



Length: _____

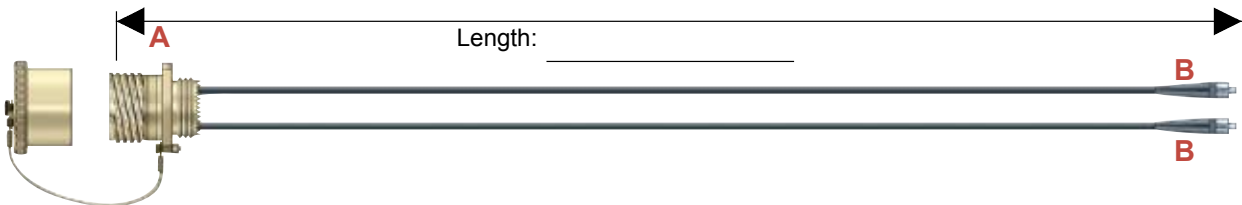
A Connector:

- Jam Nut or Square Flange or Plug
- Pin Skt Genderless Contact Qty _____
- MIL-DTL-38999 Style _____
- GHD High Density _____
- MIL-PRF-28876 Style _____
- Next Generation (NGCON) _____
- GFOCA Hermaphroditic _____
- Custom Connector _____
- Termini Part No. _____
- Dust Cover: Yes No

B Connector:

- Jam Nut or Square Flange or Plug
- Pin Skt Genderless Contact Qty _____
- MIL-DTL-38999 Style _____
- GHD High Density _____
- MIL-PRF-28876 Style _____
- Next Generation (NGCON) _____
- GFOCA Hermaphroditic _____
- Custom Connector _____
- Termini Part No. _____
- Dust Cover: Yes No

FIBER OPTIC BREAKOUT ASSEMBLY:



Length: _____

A Connector:

- Jam Nut or Square Flange or Plug
- Pin Skt Genderless Contact Qty _____
- MIL-DTL-38999 Style _____
- GHD High Density _____
- MIL-PRF-28876 Style _____
- Next Generation (NGCON) _____
- GFOCA Hermaphroditic _____
- Custom Connector _____
- Termini Part No. _____
- Dust Cover: Yes No

B Connector:

- ST Connector _____
- FC Connector _____
- SC Connector _____
- SMA Connector _____
- LC Connector _____
- Other _____

Every Picture Tells a Story



This One Speaks Volumes

Glenair is in the business of solving even the most complex interconnect design problems. That's why we've built our fiber optic product line to take advantage of our forty years of experience in harness assembly and interconnect packaging. We know that your problem isn't solved when the connector and cable are selected. The real work starts with the packaging of the key components for actual use. Glenair is ready with fiber media

protection solutions that include convoluted tubing, overmolding, jacketing, and metal or fabric overbraiding. We also produce a line of robust composite junction boxes, complete with all the necessary feed-throughs and connector fittings. At Glenair, we're ready to go with both the individual fiber optic technologies, as well as the most innovative and effective packaging solutions available today. Now **that's** a story worth telling.



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United States • United Kingdom • Germany • France • Nordic • Italy • Spain • Japan

www.glenair.com



PRODUCT FEATURES

- **Stainless Steel Body**
- **Precision Ceramic Alignment Sleeves**
- **Optional Stainless Steel Alignment Sleeves**
- **Precision Ceramic Ferrule**
- **Stainless Steel Protective Thread-On Cover**
- **Size 16 Cavities Accept Both M29504 Fiber Optic Contacts and M39029 Electrical Contacts**
- **Concentric and Diametric Tolerances Controlled within One Micron (.00004 of an Inch)**
- **Same Day Availability**

The Glenair Family of Qualified MIL-PRF-29504 Fiber Optic Termini and Composite MIL-DTL-38999 Type Connectors Provide Precise Optical Performance

Better Ferrule Design Translates to Better Optical Performance

Glenair's unique alignment techniques maximize optical performance and provide reliable, repeatable interconnection of optical fibers. Ferrule design, critical to the performance of the termini, has traditionally relied on a machined stainless steel ferrule incorporating a precision micro drilled hole. Glenair's 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. 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).

Connector System Accommodates Both Fiber Optic and Electrical Contacts

Glenair's MIL-PRF-29504/4 and /5 Qualified Fiber Optic Termini are specifically designed for use in the D38999 Series III connector, and provide optimal performance when compared to other fiber optic termini. And because Glenair's precision manufactured D38999 style connectors exactly conform to the MIL-DTL-38999 specification, they can accept standard size MIL-C-39029 size 16 electrical contacts as well.

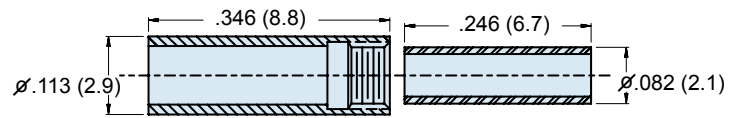
NOTE: M39029/58-364 size 16 electrical pin contacts and M39029/56-352 size 16 electrical socket contacts may also be used in hybrid configurations with the M29504 fiber optic contact. So, for advanced, tactical optical, electrical or hybrid optical/electrical applications, Glenair's MIL-DTL-38999 style connectors provide maximum flexibility and performance.



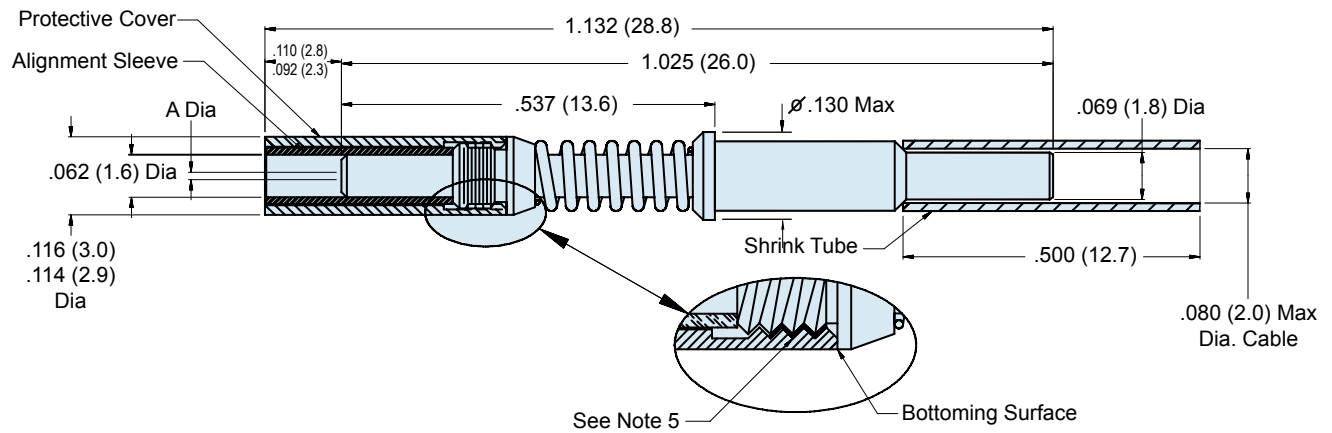
181-001
Size 16 Fiber Optic Socket Terminus
MIL-PRF-29504/5

181-001-126 K

Product Series
Basic Number
Dash Number
(Table I)
K = Stainless
Steel Alignment Sleeve
(Omit for Ceramic Alignment Sleeve)



PROTECTIVE COVER ALIGNMENT SLEEVE
(Included with Terminus)



APPLICATION NOTES

1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number.
2. Material/ Finish:
Ferrule, Alignment Sleeve: Zirconia Ceramic/N.A. or Stainless Steel/Passivate.
Terminus Assembly: Stainless Steel/Passivate
Spacer, Spring, and cover: Stainless Steel/Passivate
Shrink Tube: Kynar/N.A
3. Alignment Sleeve & Protective Cover can also be ordered separately (Table II).
4. Metric dimensions (mm) are indicated in parentheses.
5. Threaded protective cover must be retained using Thread locker "Loctite 222" prior to insertion and fully seated against Terminus body as shown. See Assembly Procedure on page B-8 for complete termination instruction.
6. See 182-001S for Socket Terminus Polishing Tool.
7. Recommended insertion/removal tool:
P/N: M81969/14-03 or equivalent
8. Consult factory for qualification status.

181-001
Size 16 Fiber Optic Socket Terminus
MIL-PRF-29504/5



TABLE I: FIBER SIZE

Assembly Dash Number	Fiber Size Core/Cladding**	A Dia. (Microns)	Reference Only M29504/5-XXXX
181-001-125	9/125 (Singlemode)	125.5	M29504/5-4237*
181-001-126S	9/125 (Singlemode)	126	M29504/5-4238*
181-001-126	50/125 & 62.5/125	126	M29504/5-4239*
181-001-127	50/125 & 62.5/125	127	M29504/5-4046
181-001-142	100/140	142	M29504/5-4049
181-001-144	100/140	144	N/A
181-001-145	100/140	145	M29504/5-4050
181-001-156	62.5/125/155 (Polyimide)	156	M29504/5-4240*
181-001-157	62.5/125/155 (Polyimide)	157	M29504/5-4241*
181-001-173	100/140/172 (Polyimide)	173	M29504/5-4088
181-001-175	100/140/172 (Polyimide)	175	M29504/5-4242*
181-001-231	200/230	231	N/A
181-001-236	200/233	236	M29504/5-4243*
181-001-286	200/280	286	M29504/5-4244*
181-001-448	400/440	448	M29504/5-4245*
181-001-533	486/500	533	N/A

* See Note 8

** Consult factory for termini which accommodate 600 micron and 1000 micron plastic or glass fiber.

TABLE II: TERMINUS ACCESSORIES

Assembly Dash Number	Terminus Accessories
181-001-S	Ceramic Alignment Sleeve
181-001-K	Stainless Steel Alignment Sleeve
181-001-C	Protective cover



181-002
Size 16 Fiber Optic Pin Terminus
MIL-PRF-29504/4



APPLICATION NOTES

1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number.
2. Material/ Finish:
Ferrule, Alignment Sleeve: Zirconia Ceramic/N.A. or Stainless Steel/Passivate.
Terminus Assembly: Stainless Steel/Passivate
Shrink Tube: Kynar/N.A.
3. See 182-001P for Pin terminus Polishing Tool.
4. Metric dimensions (mm) are indicated in parentheses.
5. Recommended insertion/removal tool:
P/N: M81969/14-03 or equivalent
6. Consult factory for qualification status.
7. See Glenair Assembly Procedure on page B-8 for complete termination instructions.

181-002
 Size 16 Fiber Optic Pin Terminus
 MIL-PRF-29504/4



TABLE I: FIBER SIZE

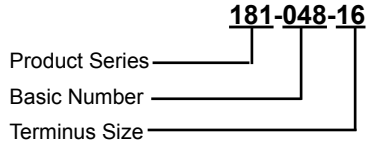
Assembly Dash Number	Fiber Size Core/Cladding**	A Dia. (Microns)	Reference Only M29504/4-XXXX
181-002-125	9/125 (Singlemode)	125.5	M29504/4-4208*
181-002-126S	9/125 (Singlemode)	126	M29504/4-4209*
181-002-126	50/125 & 62.5/125	126	M29504/4-4210*
181-002-127	50/125 & 62.5/125	127	M29504/4-4040
181-002-142	100/140	142	M29504/4-4043
181-002-144	100/140	144	N/A
181-002-145	100/140	145	M29504/4-4044
181-002-156	62.5/125/155 (Polyimide)	156	M29504/4-4211*
181-002-157	62.5/125/155 (Polyimide)	157	M29504/4-4212*
181-002-173	100/140/172 (Polyimide)	173	M29504/4-4087
181-002-175	100/140/172 (Polyimide)	175	M29504/4-4213*
181-002-231	200/230	231	N/A
181-002-236	200/233	236	M29504/4-4214*
181-002-286	200/280	286	M29504/4-4215*
181-002-448	400/440	448	M29504/4-4216*
181-002-533	486/500	533	N/A

* See Note 6

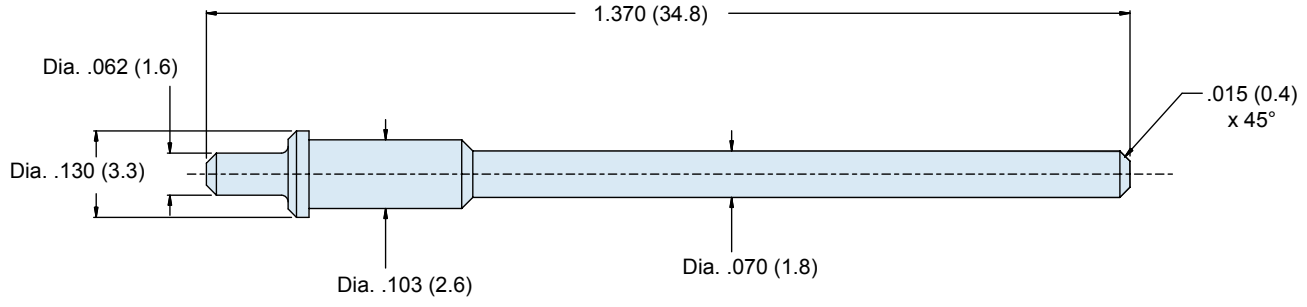
** Consult factory for termini which accommodate 600 micron and 1000 micron plastic or glass fiber.



181-048
Size 16 Fiber Optic Dummy Pin Terminus
MIL-PRF-29504/4 & 5 Style



The Glenair Dummy Pin Terminus is designed to seal against the rear grommet and interfacial seal of D38999 style connectors.



- APPLICATION NOTES**
1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number, space permitting.
 2. Material/ Finish:
Terminus: High Grade Engineering Thermoplastic
 3. Recommended insertion/removal tool:
P/N: M81969/14-03 or equivalent
 4. Metric dimensions (mm) are indicated in parentheses.

**MIL-PRF-29504 /4 & /5 Qualified
Fiber Optic Termini
Performance Data**



TERMINI SPECIFICATIONS	
Operating Temperature Range	-65°C to +200°C
Thermal Cycling	-65°C to +150°C
Thermal Shock	-65°C to +150°C, 5 Cycles
Temperature Life	+150°C for 1,000 Hours
Random Vibration	20 - 2,000Hz, 42.2 g's
Shock (Half Sine)	Pulse 40g Peak Load
Mechanical Shock	MIL-S-901D, Grade A, type B, Class I
Mating Durability	500 Cycles, Cleaning after 100 Matings
Salt Spray	40 Hours (Terminus Only)
Cable Retention Force	25 Lbs. Depending on Cable Construction

Signal discontinuities measured at 4 microseconds maximum with 0.5dB maximum change in optical transmittance during and after these tests.
Test reports and MIL-PRF-29504 qualification documentation available upon request.

1. Glenair Recommended Fiber Strip Dimensions:

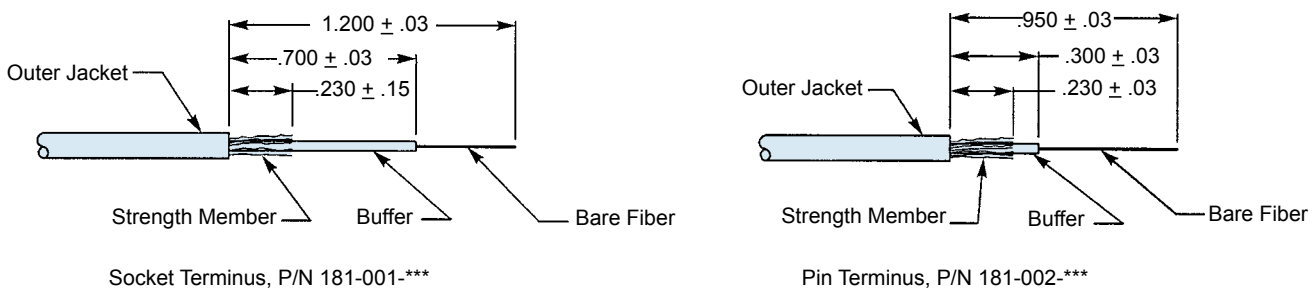


Figure 1

2. Glenair Recommended Adhesives:

- Tra-Bond, Tra-Con BAF 113SC (Heat Cure 1 Hr. @ 65°C or 24 Hr. Air Cure). For applications -55° to +150°C.
- EPO-TEC 353ND (Ramped Heat Cure: 30 Min. @ 80°C, 30 Min. @ 100°C, 10 Min. @ 150°C). For applications -65°C to +150°C.

3. Termination Steps:

- Install Terminus Shrink Sleeve
- Measure and Strip Fiber to Appropriate Length per Figure 1.
- Fill Syringe with Adhesive (No Air Bubble Should be Present).
- Completely Fill Terminus with Epoxy.
- Evenly Distribute Strength Member Over Rear of Terminus.
- Slide Sleeve to Base of Terminus and Heat Shrink using Heat Gun (Do Not Overheat the Fiber).
- Clean Terminus Body Using Isopropyl Alcohol.
- Add a Small Bead of Epoxy to the Tip of the Terminus (See Figure 2).

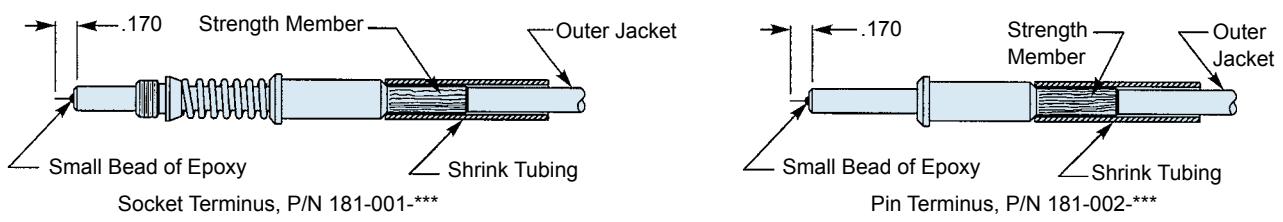


Figure 2

4. Cure Termination using Curing Oven.
5. Cleave Excess Fiber using Fiber Scribe.
6. Polishing Procedure:

- STEP 1: Use 9 Micron Diamond Film to Remove adhesive.
- STEP 2: Use 3 Micron Diamond Film to Polish.
- STEP 3: Use 1 Micron Diamond Film for Final Polish.
- STEP 4 (Singlemode Only): Polish using 65-70 Shore Rubber Pad and with .1 or .3 Micron Diamond Film.

7. Visually Inspect Fiber Termination at 200X Magnification. Core Area Must be Free of Epoxy, Scratches, Pits, and Cracks.

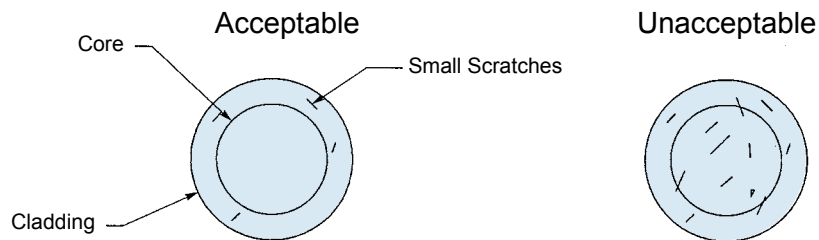


Figure 3

8. Socket Terminus Alignment Sleeve and Protective Cover Installation:

- Install Ceramic Sleeve.
- Apply "Loctite 222" on 3 Full Threads of the Terminus
- Screw Protective Cap onto Terminus Until Fully Seated.

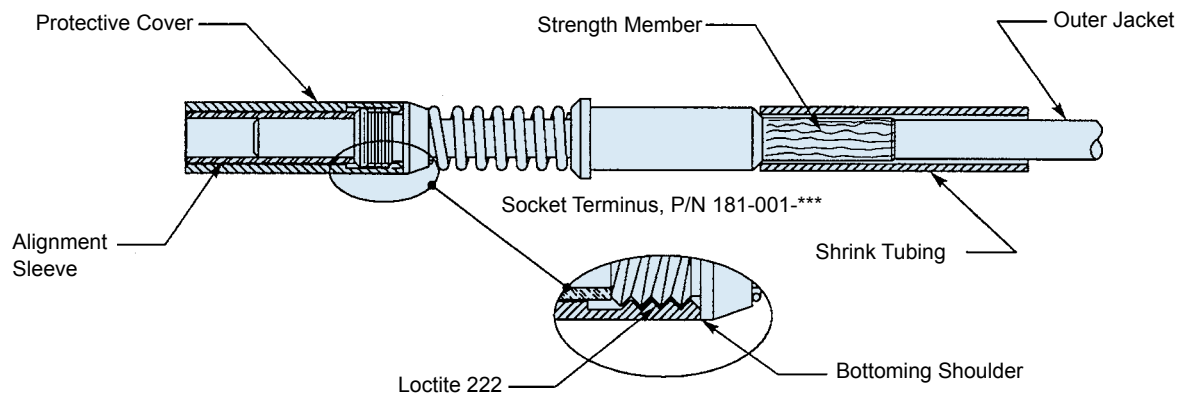


Figure 4



180-091
MIL-DTL-38999 Style Fiber Optic Connector
Insert Arrangements and Finish Table II

Mating face of Pin Insert Shown
Insert Arrangements per MIL-STD-1560

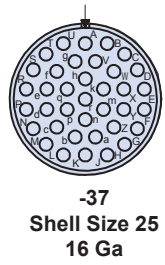
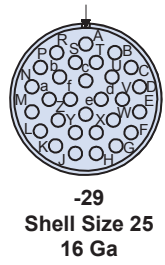
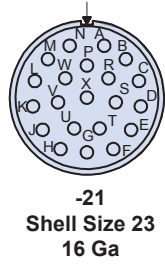
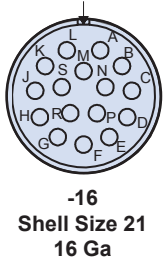
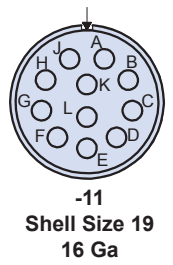
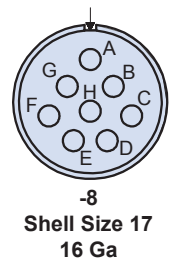
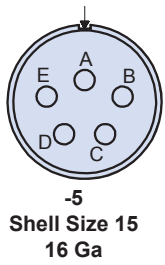
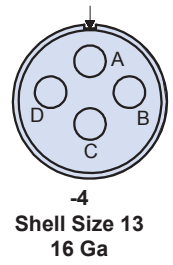
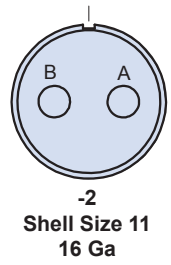


TABLE II: MATERIAL AND FINISH		
SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL*		Electro-Deposited Nickel
Z1*		Passivate

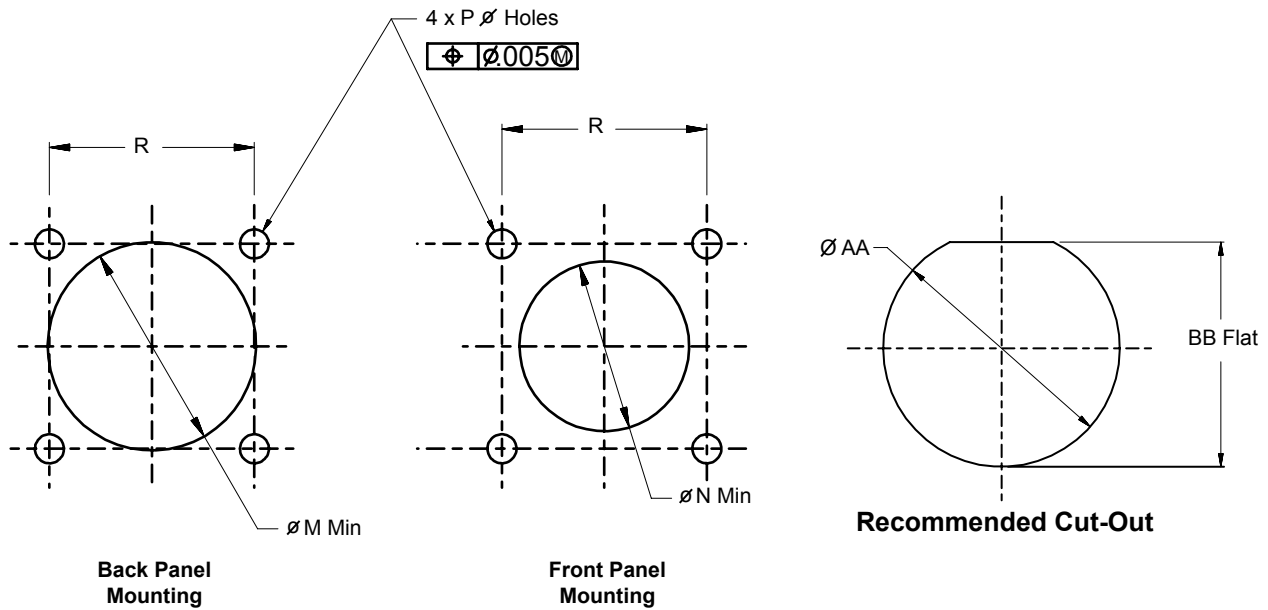
*RoHS Compliant

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

"XO" Finish composite Jam Nut Receptacle is supplied with Unplated Composite Jam Nut and accommodates .093 maximum panel thickness.

"XO" finish composite plug connectors are supplied less RFI spring.

180-091
 MIL-DTL-38999 Style Fiber Optic Connector
 Panel Cut-Out and Panel Mounting Holes



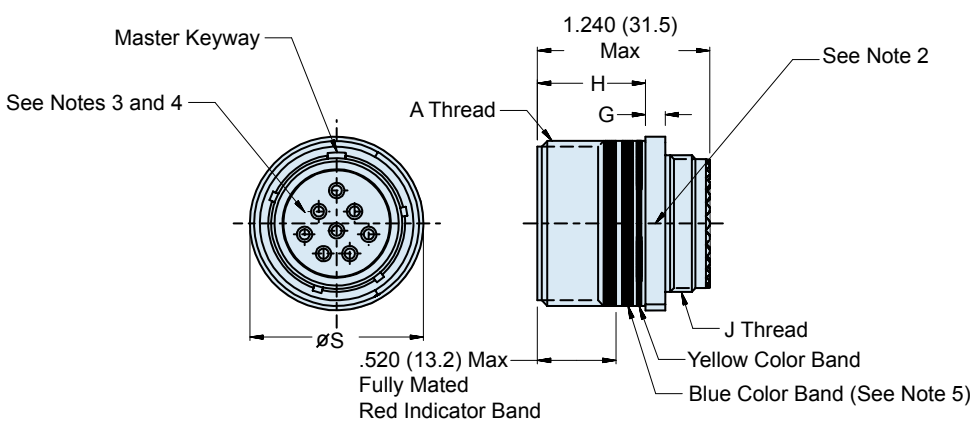
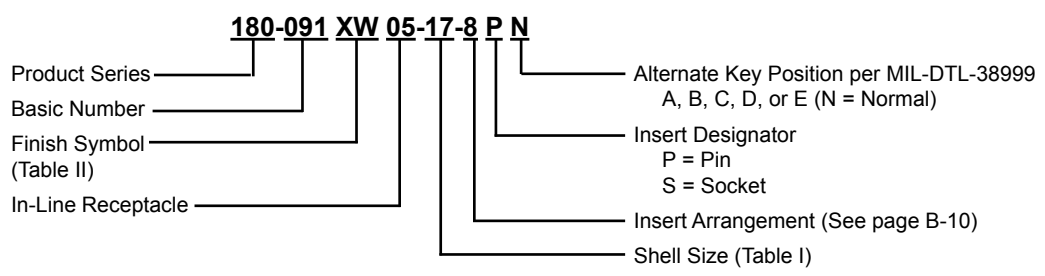
Recommended Mounting Holes for
 Wall Mount Receptacle

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

Metric dimensions (mm) are indicated in parentheses



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



05 - IN-LINE RECEPTACLE

APPLICATION NOTES

- Material/ Finishes:
Shells - See Table II
Insulator- High Grade Rigid Dielectric/ N.A.
Seals- Fluorosilicone/ N.A.
- Assembly to be identified with Glenair's name, part number and date code space permitting.
- Insert arrangement in accordance with MIL-STD-1560, See Page B-10.
- Insert arrangement shown is for reference only.
- Blue Color Band indicates rear release retention system.
- For appropriate Glenair Terminus part numbers see Glenair Drawing 181-001 and 181-002.
- Metric Dimensions (mm) are indicated in parentheses.

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



MIL-DTL-38999
Connectors

TABLE I: SHELL SIZE

Shell Size Code	Shell Size	A Thread	G	H	S Dia	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

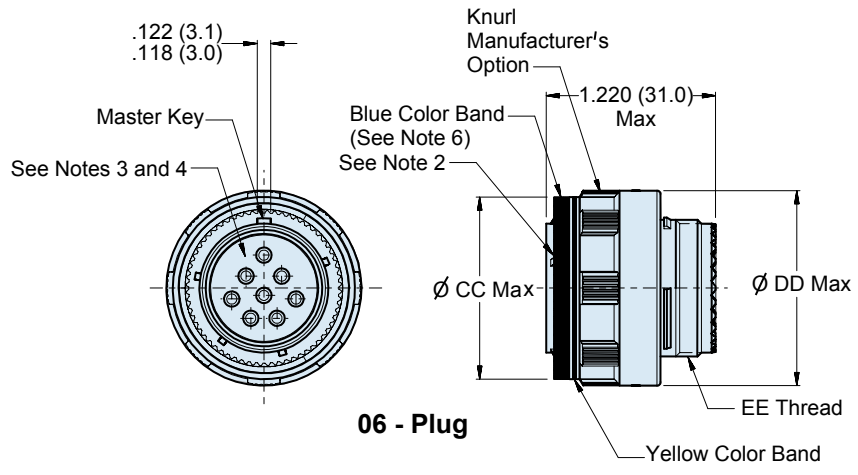
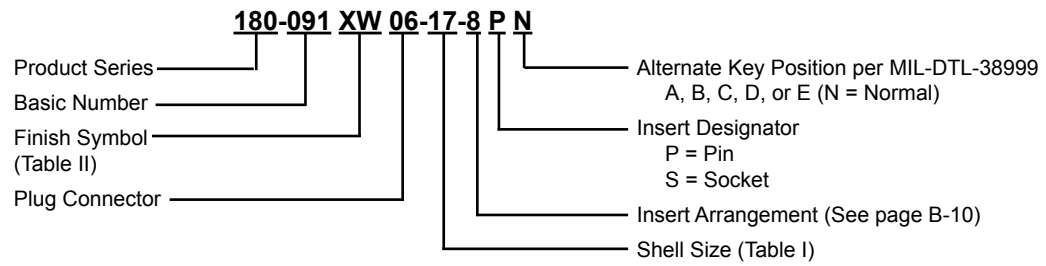
TABLE II: MATERIAL AND FINISH

SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN	Zinc-Nickel, Black	
MS	Stainless Steel	Electroless Nickel
ZL*		Electro-Deposited Nickel
Z1*		Passivate

*RoHS Compliant



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



APPLICATION NOTES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Material/ Finishes:
Barrel, Coupling Nut - See Table II (Composite Coupling Nut - No Plating Required).
Insulators- High Grade Rigid Dielectric/ N.A
Seals- Fluorosilicone/ N.A. 2. Assembly to be identified with Glenair's name, part number and date code space permitting. 3. Insert arrangement in accordance with MIL-STD-1560, | <p style="text-align: center;">See Page B-10.</p> <ol style="list-style-type: none"> 4. Insert arrangement shown is for reference only. 5. Blue Color Band indicates rear release retention system. 6. For appropriate Glenair Terminus part numbers see Glenair Drawing 181-001 and 181-002. 7. Metric Dimensions (mm) are indicated in parentheses. 8. "XO" finish composite connectors are supplied less RFI spring. |
|--|--|

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



TABLE I: SHELL SIZE

Shell Size Code	Shell Size	CC Max Dia	DD Max Dia	EE Thread
B	11	.929 (23.6)	.984 (25.0)	M15 x 1.0-6g 0.100R
C	13	1.110 (28.2)	1.157 (29.4)	M18 x 1.0-6g 0.100R
D	15	1.232 (31.3)	1.280 (32.5)	M22 x 1.0-6g 0.100R
E	17	1.358 (34.5)	1.406 (35.7)	M25 x 1.0-6g 0.100R
F	19	1.469 (37.3)	1.516 (38.5)	M28 x 1.0-6g 0.100R
G	21	1.594 (40.5)	1.642 (41.7)	M31 x 1.0-6g 0.100R
H	23	1.720 (43.7)	1.768 (44.9)	M34 x 1.0-6g 0.100R
J	25	1.843 (46.8)	1.890 (48.0)	M37 x 1.0-6g 0.100R

TABLE II: MATERIAL AND FINISH

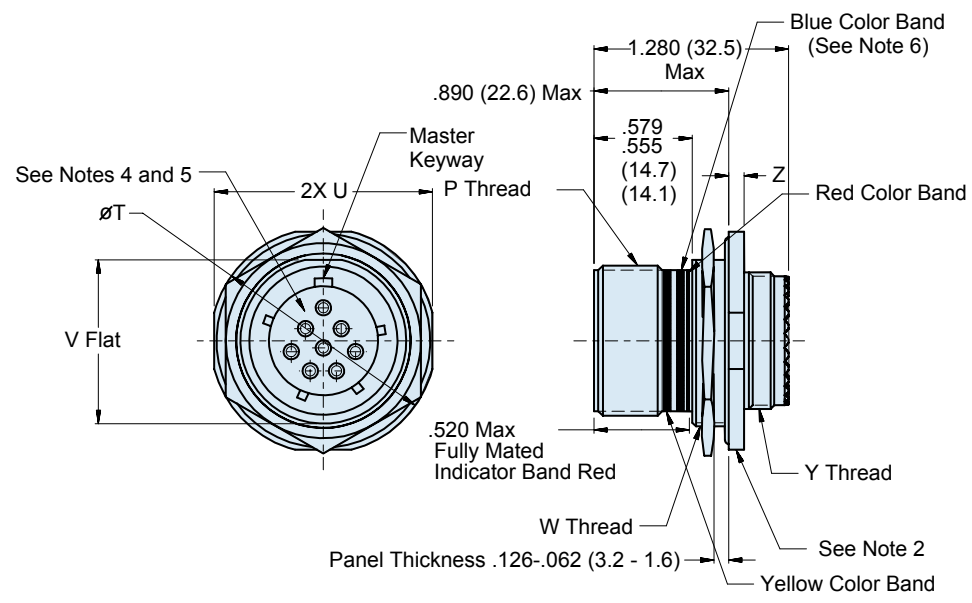
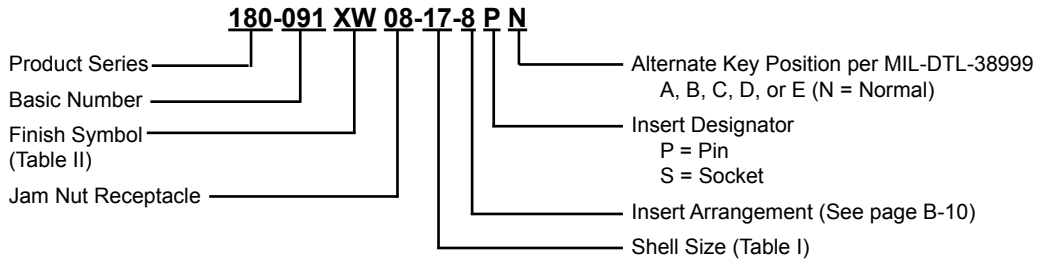
SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL*		Electro-Deposited Nickel
Z1*		Passivate

*RoHS Compliant

"XO" finish composite plug connectors are supplied less RFI spring.



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



08 - JAM NUT MOUNT RECEPTACLE

APPLICATION NOTES

- Material/ Finishes:
Shells, Jam Nut - See Table II (Composite Jam Nut No Plating Required).
Insulators- High Grade Rigid Dielectric/ N.A
Seals- Fluorosilicone/ N.A.
- Assembly to be identified with Glenair's name, part number and date code space permitting.
- Modified major diameter 31.80-31.95 (1.252-1.257).
- Insert arrangement in accordance with MIL-STD-1560, See Page B-10.
- Insert arrangement shown is for reference only.
- Blue Color Band indicates rear release retention system.
- For appropriate Glenair Terminus part numbers see Glenair Drawing 181-001 and 181-002.
- Metric dimensions (mm) are in parentheses.
- Jam nut for composite jam nut mount receptacle is aluminum, and plated same as connector shell.
- "XO" finish composite jam nut mount receptacle is supplied with unplated composite jam nut, and accommodates .093 maximum panel thickness.

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



TABLE I: SHELL SIZE

Shell Size Code	Shell Size	P Thread	T Dia	U	V	W Thread	Y Thread	Z
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)
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)

*See Note 3

TABLE II: MATERIAL AND FINISH

SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
ZL*	Stainless Steel	Electro-Deposited Nickel
Z1*		Passivate

*RoHS Compliant

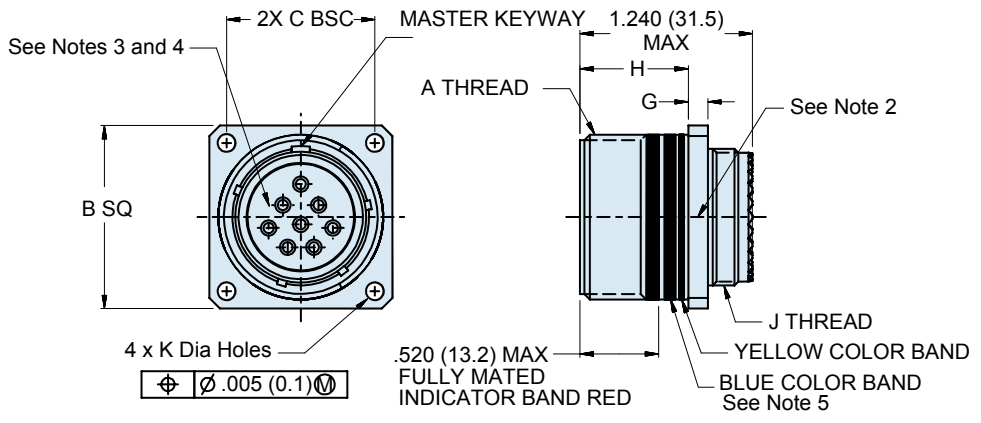
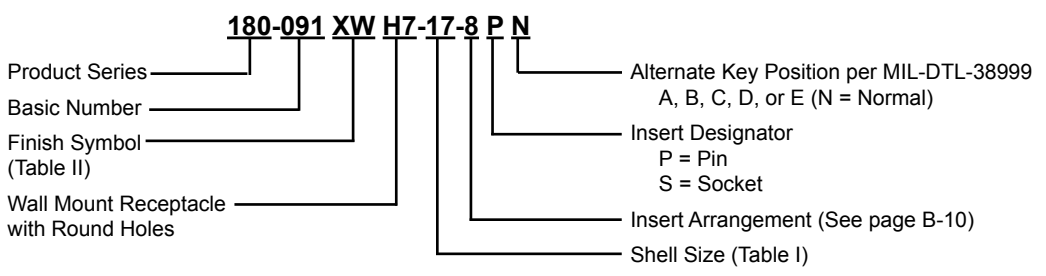
NOTES: Jam Nut for composite Jam Nut Mount Receptacle is Aluminum and plated same as connector shell.

"XO" Finish composite Jam Nut Receptacle is supplied with Unplated Composite Jam Nut and accommodates .093 maximum panel thickness.

"XO" finish composite plug connectors are supplied less RFI spring.



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



**H7 - SQUARE FLANGE WALL MOUNT
RECEPTACLE
WITH STANDARD HOLES**

APPLICATION NOTES

- Material/ Finishes:
Shells, Jam Nut - See Table II
(Composite Jam Nut & Composite Coupling Nut No Plating Required).
Insulators- High Grade Rigid Dielectric/ N.A
Seals- Fluorosilicone/ N.A.
- Assembly to be identified with Glenair's name, part number and date code space permitting.
- Insert arrangement in accordance with MIL-STD-1560, See Page B-10.
- Insert arrangement shown is for reference only.
- Blue Color Band indicates rear release retention system.
- For appropriate Glenair Terminus part numbers see Glenair Drawing 181-001 and 181-002.
- Metric dimensions (mm) are in parentheses.

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



TABLE I: SHELL SIZE

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

TABLE II: MATERIAL AND FINISH

SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
ZL*	Stainless Steel	Electro-Deposited Nickel
Z1*		Passivate

*RoHS Compliant

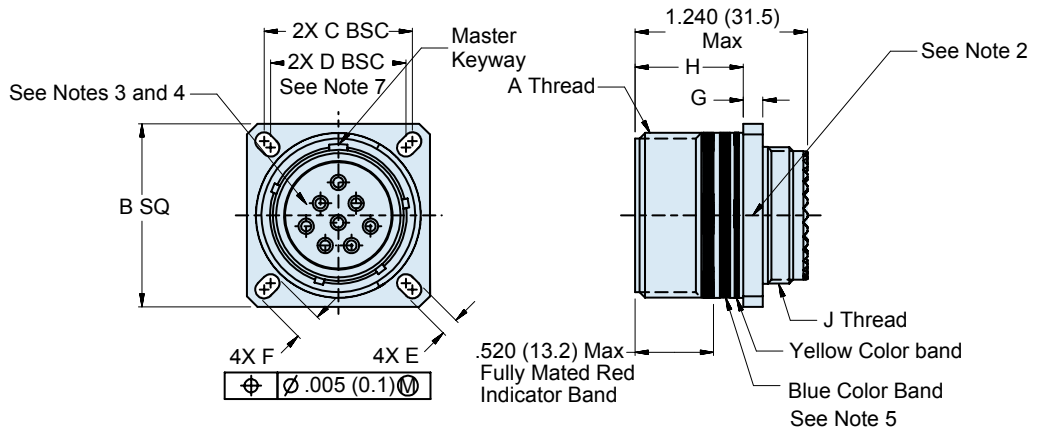
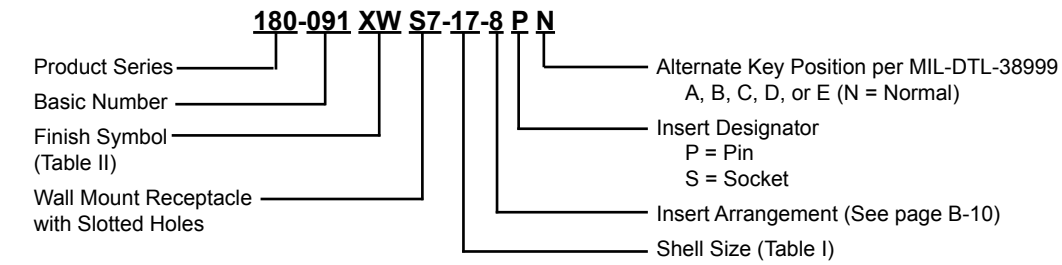
NOTES: Jam Nut for composite Jam Nut Mount Receptacle is Aluminum and plated same as connector shell.

"XO" Finish composite Jam Nut Receptacle is supplied with Unplated Composite Jam Nut and accommodates .093 maximum panel thickness.

"XO" finish composite plug connectors are supplied less RFI spring.



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



**S7 - WALL MOUNT RECEPTACLE
WITH SQUARE FLANGE AND SLOTTED HOLES**

APPLICATION NOTES

- Material/ Finishes:
Shell - See Table II
Insulators- High Grade Rigid Dielectric/ N.A
Seals- Fluorosilicone/ N.A.
- Assembly to be identified with Glenair's name, part number and date code space permitting.
- Insert arrangement in accordance with MIL-STD-1560, See Page B-10.
- Insert arrangement shown is for reference only.
- Blue Color Band indicates rear release retention system.
- For appropriate Glenair Terminus part numbers see Glenair Drawing 181-001 and 181-002.
- Front Panel Mount Only.
- Metric dimensions (mm) are in parentheses.

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



TABLE I: 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 (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

*Front Panel Mount Only

TABLE II: MATERIAL AND FINISH

SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL*		Electro-Deposited Nickel
Z1*		Passivate

*RoHS Compliant

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



TABLE I: SHELL SIZE

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

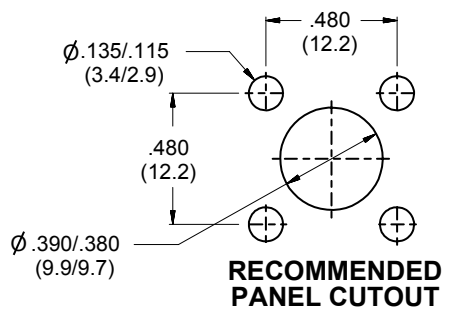
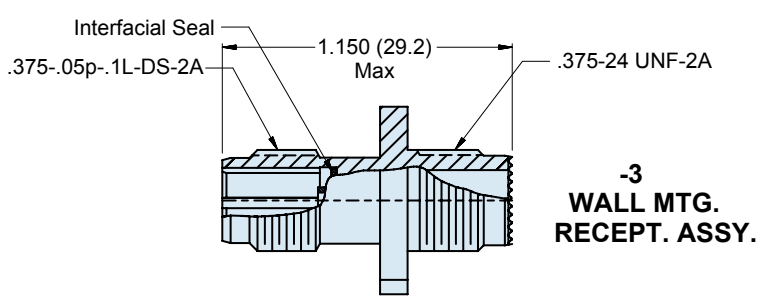
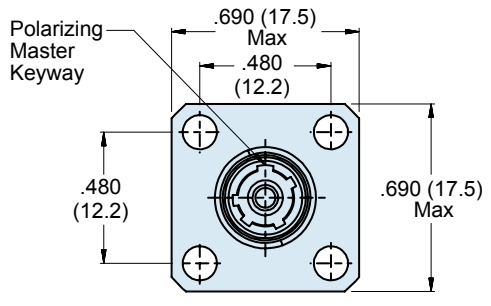
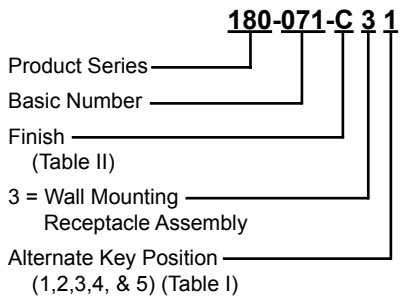
TABLE II: MATERIAL AND FINISH

SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
MS	Stainless Steel	Electroless Nickel
ZL*		Electro-Deposited Nickel
Z1*		Passivate

*RoHS Compliant

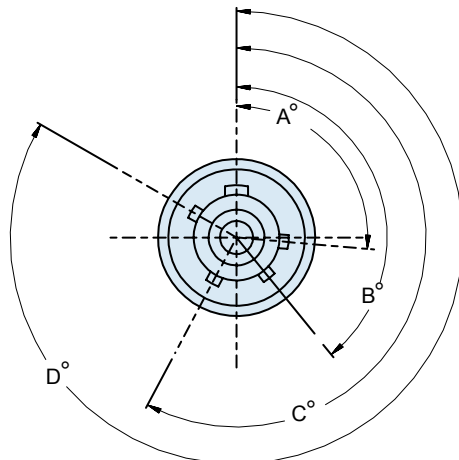


**180-071 (-3) Wall Mount
Single Channel Fiber Optic Receptacle Connector
Environmental Resistant
for Glenair 181-001 and 181-002 Termini**



- APPLICATION NOTES**
1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number.
 2. Glenair 180-071 Connector features:
 - A. Receptacle Body, Jam Nut Coupling Nut: Aluminum Alloy (See Table II).
 - B. Interfacial Seal: Fluorosilicone.
 - C. Fiber Optic Termini: Glenair 181 Series (Not supplied).
 - D. Operating Temperature Range: -55°C to +125°C.
 3. Metric dimensions (mm) are in parentheses.

**180-071 (-3) Wall Mount
Single Channel Fiber Optic Receptacle Connector
Environmental Resistant
for Glenair 181-001 and 181-002 Termini**



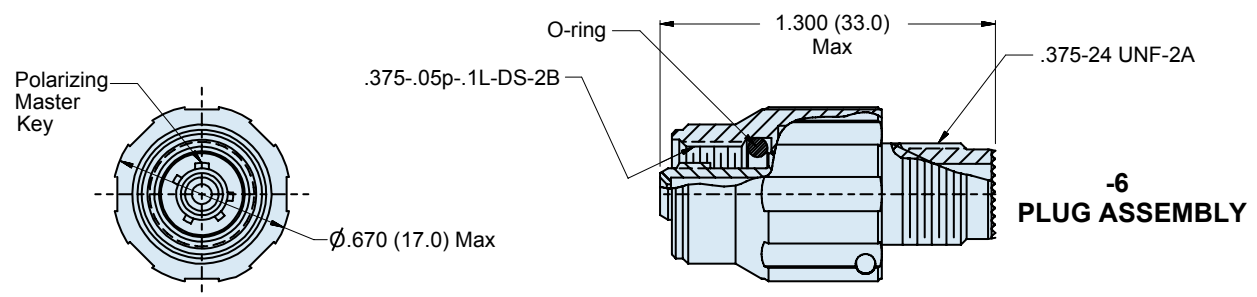
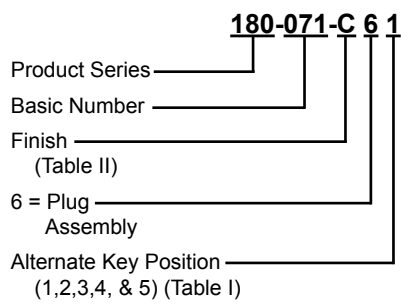
As Viewed from Rear of Connector

TABLE I: KEYWAY LOCATION				
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: FINISH		
SYM	MATERIAL	FINISH
C	Aluminum	Black Anodize
M	Aluminum	Electroless Nickel
NF	Aluminum	Cadmium, Olive Drab over Electroless Nickel
ZN	Aluminum	Zinc-Nickel, Olive Drab over Electroless Nickel
Z1	Stainless Steel	Passivate

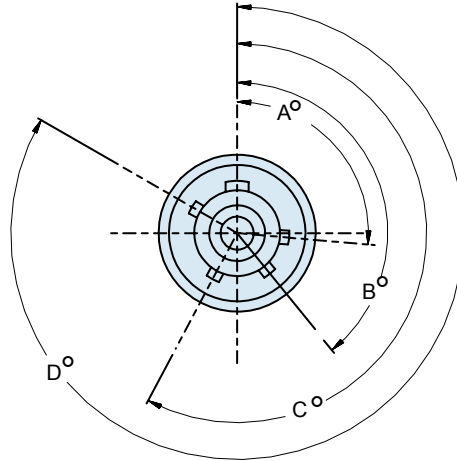


180-071 (-6) Plug
Single Channel Fiber Optic Plug Connector
Environment Resistant
for Glenair 181-001 and 181-002 Front Release Termini



- APPLICATION NOTES**
1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number.
 2. Glenair 180-071 Connector features:
 - A. Plug Body: Aluminum Alloy (See Table II).
 - B. O-Ring: Fluorosilicone.
 - C. Fiber Optic Termini: Glenair 181 Series (Not supplied).
 - D. Operating Temperature Range: -55°C to +125°C.
 3. Metric dimensions (mm) are in parentheses.

180-071 (-6) Plug
Single Channel Fiber Optic Plug Connector
Environment Resistant
for Glenair 181-001 and 181-002 Front Release Termini



As Viewed from Front of Connector

TABLE I: KEY LOCATION

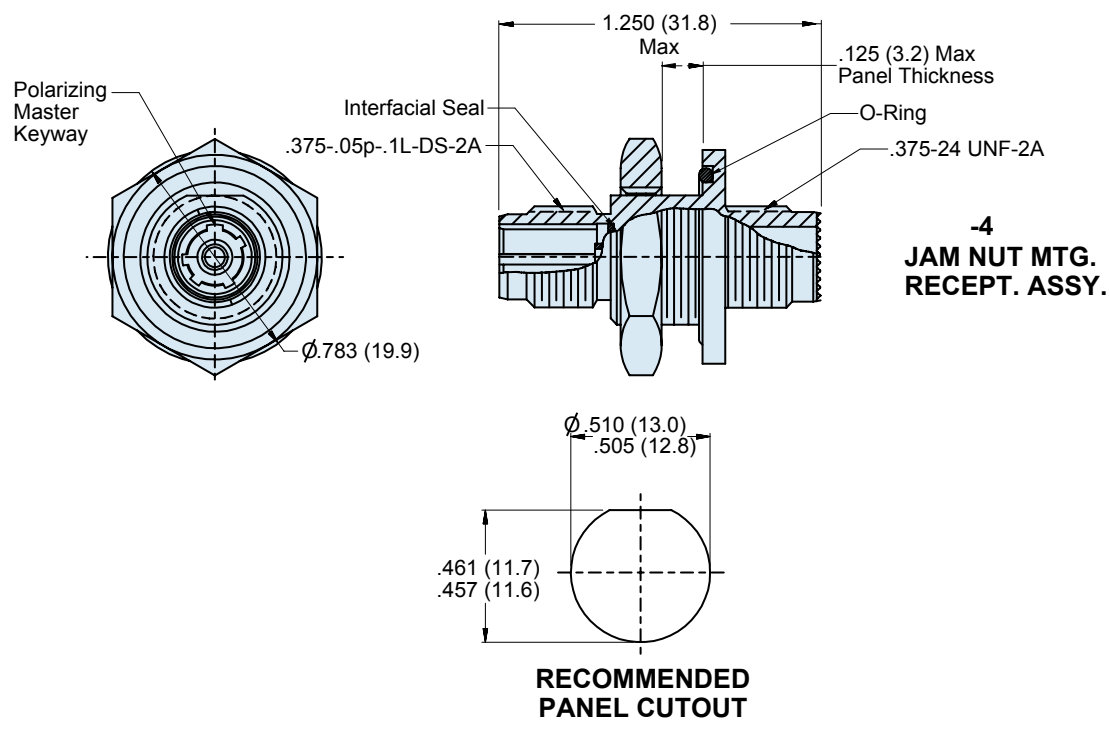
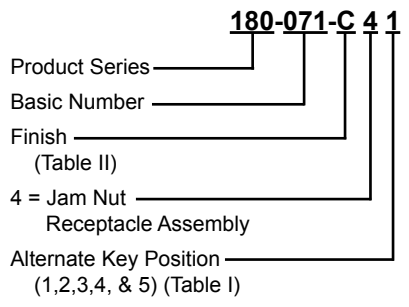
Pos	A°	B°	C°	D°
1	95	141	208	300
2	80	141	208	300
3	95	141	223	300
4	80	141	223	300
5	95	141	208	275

TABLE II: FINISH

SYM	MATERIAL	FINISH
C	Aluminum	Black Anodize
M	Aluminum	Electroless Nickel
NF	Aluminum	Cadmium, Olive Drab over Electroless Nickel
ZN	Aluminum	Zinc-Nickel, Olive Drab over Electroless Nickel
Z1	Stainless Steel	Passivate



180-071 (-4) Jam Nut
Single Channel Fiber Optic Receptacle Connector
Environment Resistant
for Glenair 181-001 and 181-002 Front Release Termini

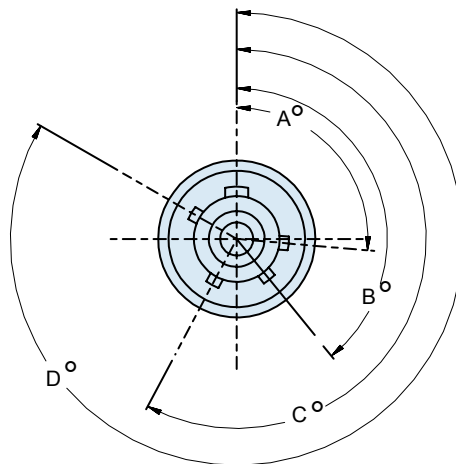


- APPLICATION NOTES**
1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number.
 2. Glenair 180-071 Connector features:
 - A. Receptacle Body, Jam Nut Coupling Nut: Aluminum Alloy (See Table II).
 - B. O-Ring, Interfacial Seal: Fluorosilicone.
 - C. Fiber Optic Termini: Glenair 181 Series (Not supplied).
 - D. Operating Temperature Range: -55°C to +125°C.
 3. Metric dimensions (mm) are in parentheses.

180-071 (-4) Jam Nut
Single Channel Fiber Optic Receptacle Connector
Environment Resistant
for Glenair 181-001 and 181-002 Front Release Termini



MIL-DTL-38999
Connectors



As Viewed from Rear of Connector

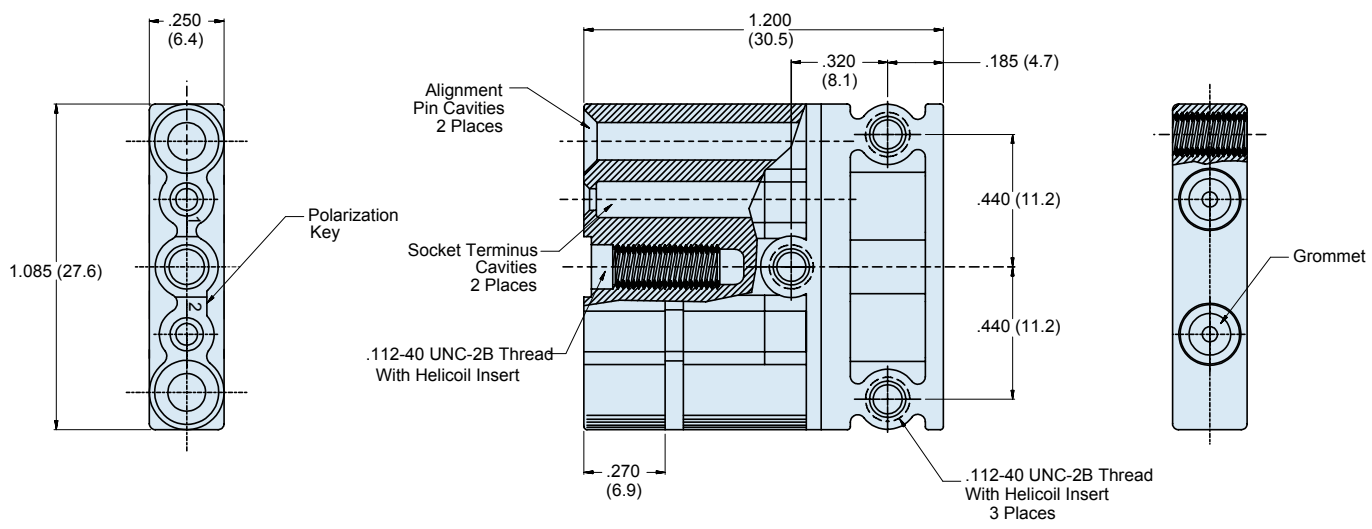
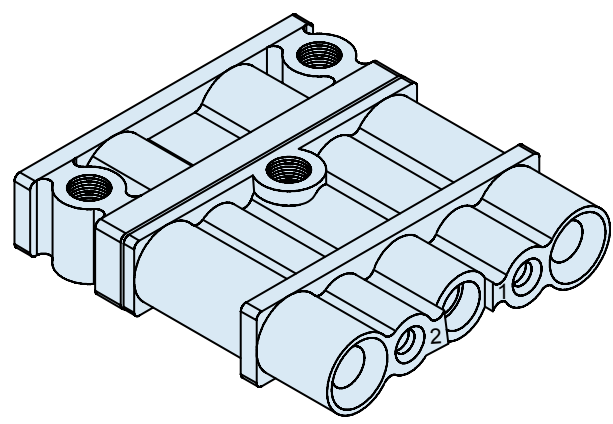
TABLE I: KEYWAY LOCATION				
Pos	A°	B°	C°	D°
1	95	141	208	300
2	80	141	208	300
3	95	141	223	300
4	80	141	223	300
5	95	141	208	275

TABLE II: FINISH		
SYM	MATERIAL	FINISH
C	Aluminum	Black Anodize
M	Aluminum	Electroless Nickel
NF	Aluminum	Cadmium, Olive Drab over Electroless Nickel
ZN	Aluminum	Zinc-Nickel, Olive Drab over Electroless Nickel
Z1	Stainless Steel	Passivate



180-052
2 Channel Fiber Optic Receptacle Connector
for MIL-PRF-29504/5 Socket Terminus

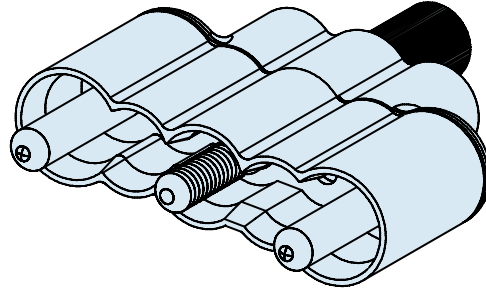
180-052
Product Series
Basic Number



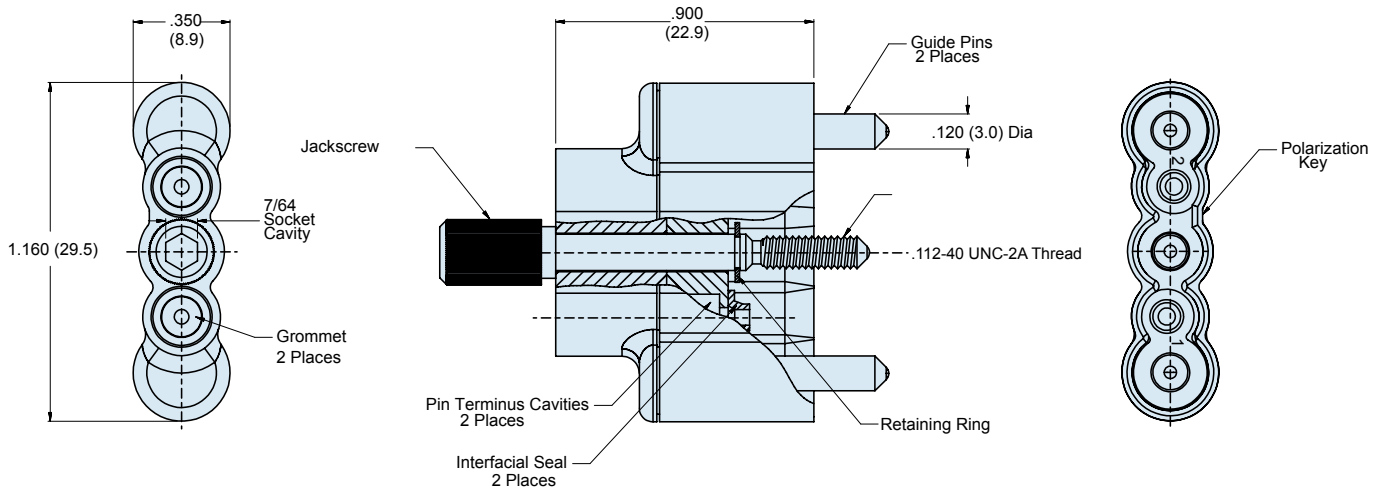
APPLICATION NOTES

1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number.
2. Material/Finish:
Connector Housing: High Grade Engineering Thermoplastic
Grommet: Fluorosilicone
Helicoil Insert: Stainless Steel
3. Connector designed to accept Glenair Part Number 181-001-XXX or MIL-PRF-29504/5 Style Fiber Optic Termini. Termini not supplied.
4. Recommended Insertion/Removal Tool: P/N: M81969/14-03 or equivalent.
5. Metric dimensions (mm) are in parentheses.

180-053
2 Channel Fiber Optic Plug Connector
for MIL-PRF-29504/4 Pin Terminus



180-053
 Product Series
 Basic Number



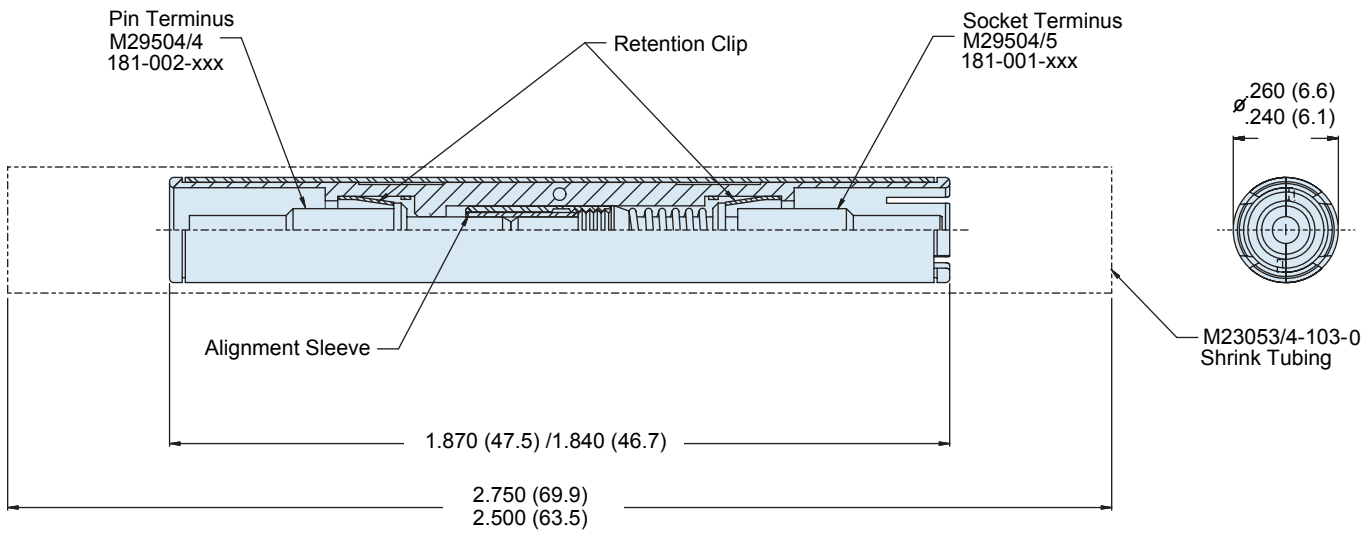
APPLICATION NOTES

1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number.
2. Material/Finish:
 Connector Housing: High Grade Engineering Thermoplastic
 Grommet, Interfacial Seal: Fluorosilicone
 Jackscrew, Guide Pin, Retaining Ring: Stainless Steel
3. Connector designed to accept Glenair Part Number 181-002-XXX or MIL-PRF-29504/4 Style Fiber Optic Termini. Termini not supplied.
4. Recommended Insertion/Removal Tool: P/N: M81969/14-03 or equivalent.
5. Metric dimensions (mm) are in parentheses.



180-076
Fiber Optic Splice
for MIL-PRF-29504/4 & 5 Termini

180-076
Product Series
Basic Number



APPLICATION NOTES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Assembly packaged in plastic bag and tag identified with manufacturer's name and part number. 2. Material/Finish:
Splice Housing: Hi-Grade Engineering Thermoplastic/N.A.
Retention Clip: Beryllium Copper/N.A. 3. Splice to be used with Glenair Termini 181-001 and 181-002 (sold separately). 4. See 182-001S for Socket Terminus Polishing Tool. | <ol style="list-style-type: none"> 5. See 182-001P for Pin Terminus Polishing Tool. 6. Recommended Insertion/Removal Tool: P/N: M81969/14-03 or equivalent. 7. See Glenair Assembly Procedure for complete termination instruction (Pages B-8 and B-9). 8. M23053/4-103-0 to be packaged loose. 9. Metric dimensions (mm) are in parentheses. |
|--|--|

To Most People It's Just a Connector



To Glenair It's a Promise

Most customers have a simple expectation when they go shopping for mission-critical interconnect components: They want fast and accurate service. Glenair addresses this most basic customer requirement in several different ways. First and foremost, by providing immediate access to our technical information and product documentation: whether you prefer an office visit, the telephone, the Internet, a CD or a printed catalog, Glenair is ready with answers to your most complex questions and design challenges. Secondly, Glenair stocks thousands of popular catalog products for those

situations when even a two or three week lead-time is just too long. We currently stock over 50,000 interconnect components—bagged and tagged and ready for immediate shipment. And for those situations when a customized solution is required, our engineers are fully versed in all aspects of interconnect system design: from shielding against EMI, to reducing weight and connector package size, to stopping corrosion and other forms of environmental damage.

You have a simple expectation: fast and accurate service. At Glenair, we're ready to give you exactly that. It's a promise.



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www.glenair.com

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



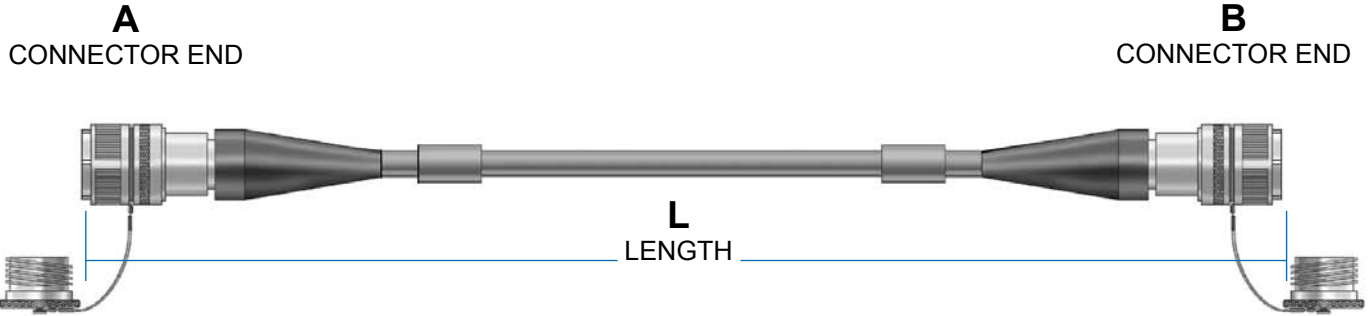
The World's Only Short Lead-Time Source for Harsh Environment Overmolded F/O Cable Assemblies

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**



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)

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-10 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**

- 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

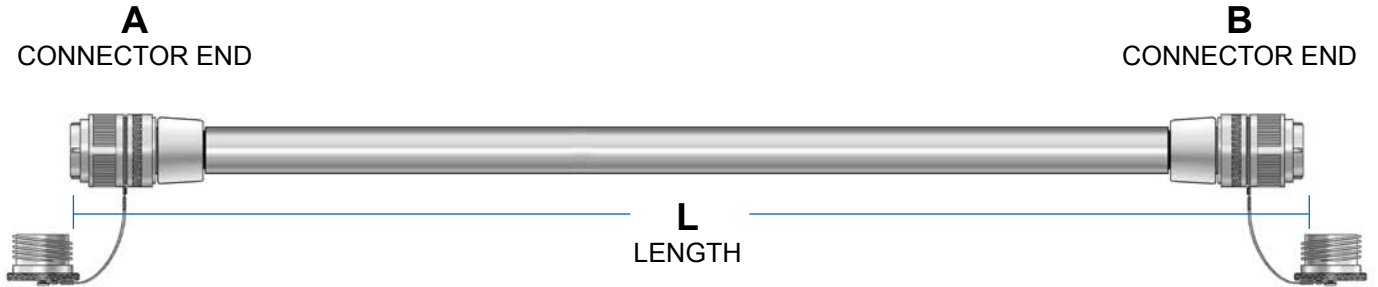
Standard Conduit Packaging

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

Consult Factory for Other Available Material Types

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



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)

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.

PRODUCT FEATURES

- Neoprene Jacketed Cable
- 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

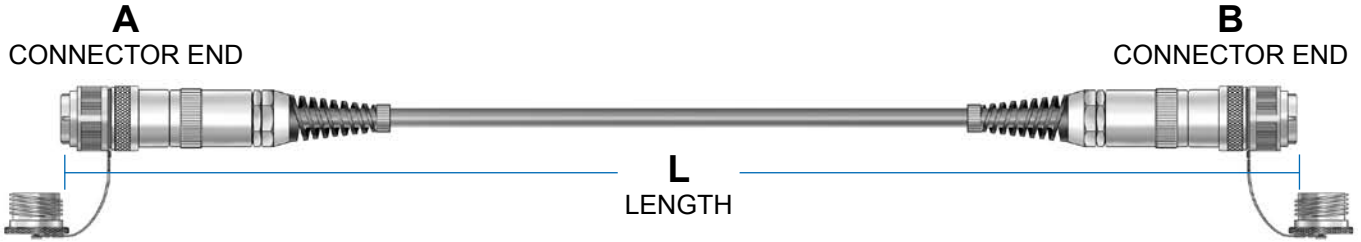
Reinforced Cable/Backshell Assemblies

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-It® 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 M For Band-It® Tooling Information

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



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)

Connector/Backshell 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)

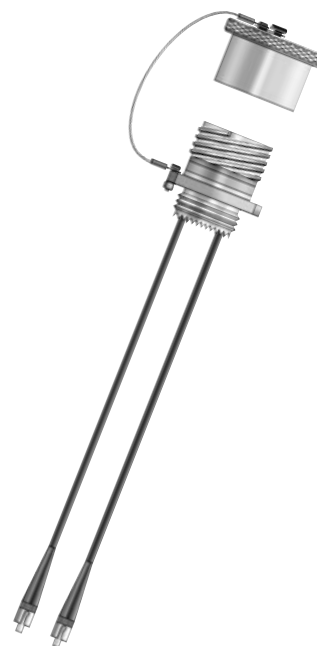
Standard Cable Make-Up:
2mm Jacketed Fiber, Polyurethane Jacketing,
Kevlar Reinforcement, Nominal Temperature
Range -40° to +85°C.
Please Reference Special Marking, Labels Or
Other Identification Specifications on Your
Purchase Order

*See Page B-10 for Insert Arrangements

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

PRODUCT FEATURES

- **Jam-Nut and Wall Mount D38999 Series III Style 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**

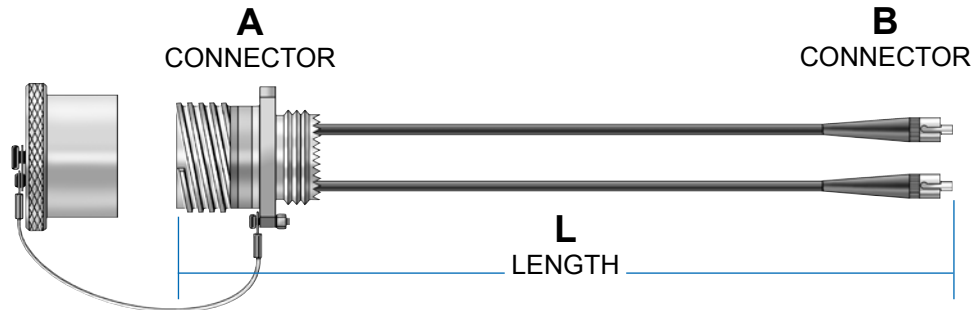


Glenair Terminated and Optically Tested Receptacle/ Pigtail Assemblies Are Ready When You Are

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**



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

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)

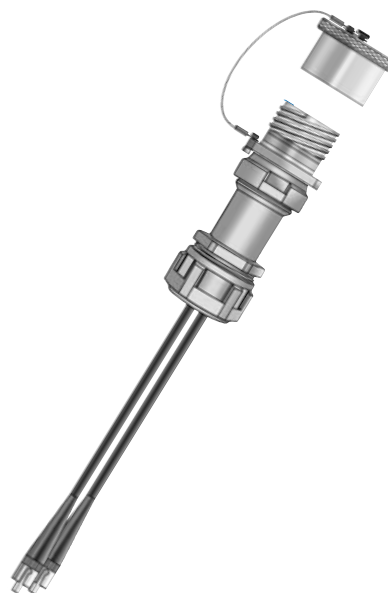
Please Reference Special Marking, Labels Or Other Identification Specifications on Your Purchase Order. Unless Indicated, "B" Connector Identification Will Follow "A" Connector Pin Designations.

*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.

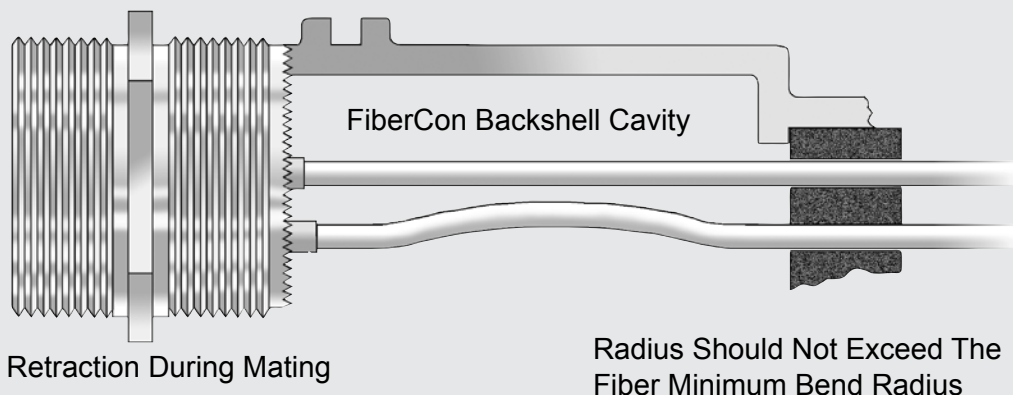
PRODUCT FEATURES

- Jam-Nut and Wall Mount D38999 Series III Style 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

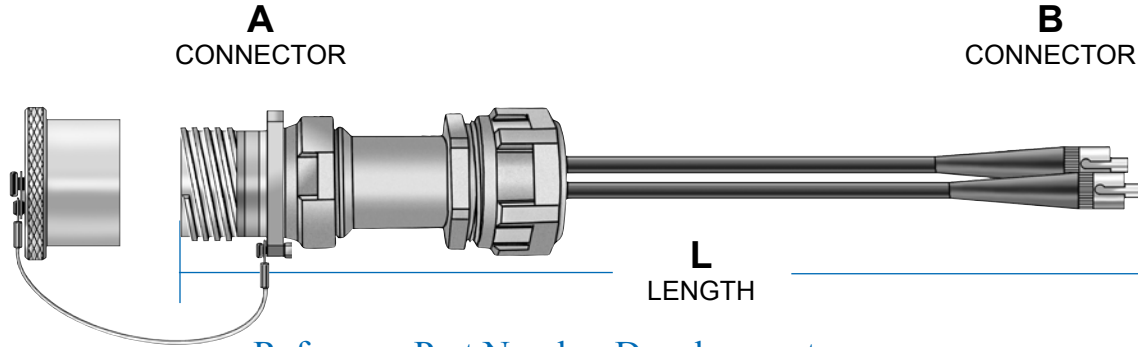
Termini Retraction and Its Effect On Micro-Bending



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**



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

Connector/Backshell 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

PRODUCT FEATURES

- Jam-Nut and Wall Mount D38999 Series III Style 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

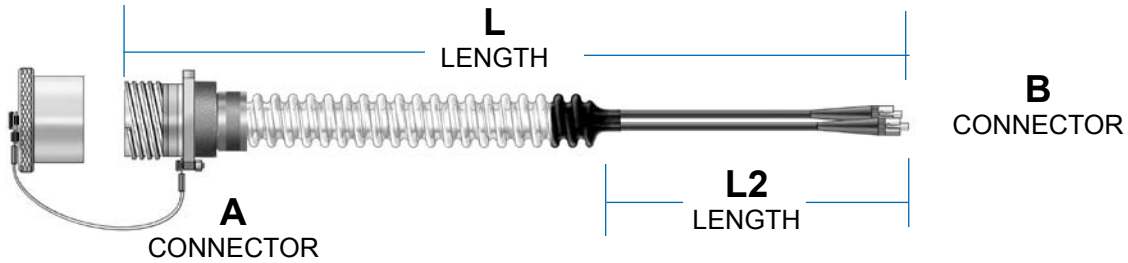


The Perfect Amount of Mechanical Protection for Fiber Media in Non-Environmental Applications

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**



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
- 4 = SMA Connector (906 Type)
- 5 = SMA Connector (905 Type)
- 7 = LC Connector
- 8 = LC Duplex
- 9 = Customer Specified

Connector/Backshell 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 Cover

- L = Less Cover
- Omit for with Cover

"L2" Length in Inches

"L" Length in Inches

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*

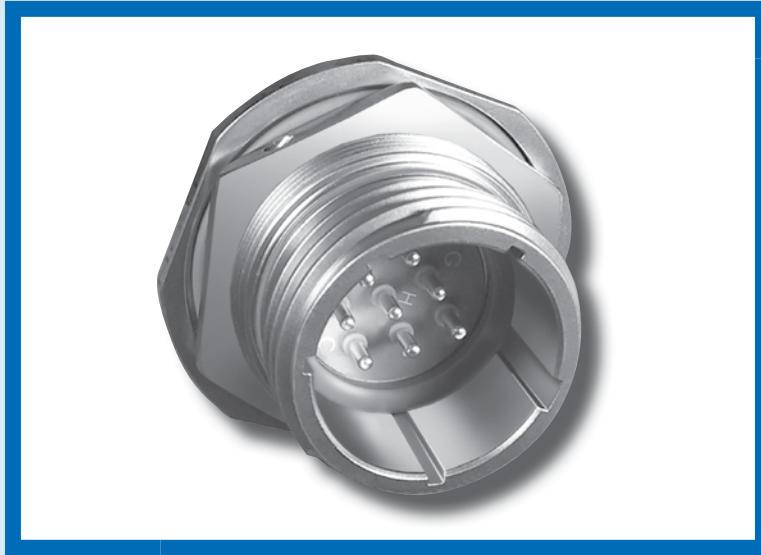
- 02 = 2 Fibers (Shell Size 11)
- 04 = 4 Fibers (Shell Size 13)
- 05 = 5 Fibers (Shell Size 15)
- 08 = 8 Fibers (Shell Size 17)
- 11 = 11 Fibers (Shell Size 19)
- 16 = 16 Fibers (Shell Size 21)
- 21 = 21 Fibers (Shell Size 23)
- 29 = 29 Fibers (Shell Size 25)
- 37 = 37 Fiber (Shell Size 25)

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.

Six Good Reasons to Buy Filter Connectors From Glenair



1. EMC Expertise

Electromagnetic Compatibility (EMC) describes efforts to control or eliminate the problems created by EMI. MIL-STD-461 defines allowable EMI emission levels, both conducted and radiated. Glenair is unique in the interconnect industry for our knowledge and expertise in solving complex EMI problems and for the broad range of technologies we provide.

2. Planar Array Technology

Glenair filter connectors rely exclusively on planar array technology for extremely effective filtering of high-frequency interference. Planar Array designs utilize ceramic capacitor arrays and ferrite inductors which externally surround each contact, and may be supplied in a single monolithic block to fit into any connector size or shape. Planar arrays may be fabricated with different capacitive values on individual pins for additional flexibility in achieving the desired level of EMC.

3. TVS

Transient Voltage Suppression (TVS) technologies are designed to shunt voltage transients, such as those generated by electromagnetic pulse (EMP), lightning strike, or other induced voltage surges, directly to

ground before such surges can damage sensitive electronic equipment. The integration of TVS diodes and diode modules into the filter connector package is a Glenair specialty.

4. Hermetics

Complete in-house hermetic capabilities makes Glenair your best value hermetic connector supplier. We can offer lightning fast turnaround on custom hermetic connectors, with and without filter elements, for both military standard and commercial applications.

5. Composites

Glenair is the recognized industry leader in the design and production of composite thermoplastic connectors and connector accessories. Our composite filter connectors provide unmatched weight reduction and corrosion protection.

6. Super Fast Service

The best filtering technology in the world is useless if you can't get your hands on it in a reasonable period of time. Glenair is committed to providing the shortest lead-times and the best application engineering support in the industry. Many of our most popular EMC technologies are in stock and ready for same-day shipment.



PRODUCT FEATURES

- Genderless Terminus Design
- Nearly Double the Density of M28876 and D38999
- Equal Optical Performance Compared to D38999
- Environmentally Sealed
- 18 AWG Front Release High Density Termini
- Precision 1.25 mm Ceramic Ferrule
- Ceramic Alignment Sleeve
- Hex Feature for Optional Tuning
- Standard Single Keying Feature for APC Polish
- Accommodates 900 Micron to 2.0 mm Jacketed Fiber
- Removable Alignment Sleeve Module, with Integral Stainless Steel Guide Pins, for Easy Cleaning

Glenair High Density F/O Connection System: Same Optical and Environmental Performance as D38999, at Just 1/2 The Size

High Density, Front Release Design

The Glenair High Density Fiber Optic Connector 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.

Glenair High Density Versus M28876

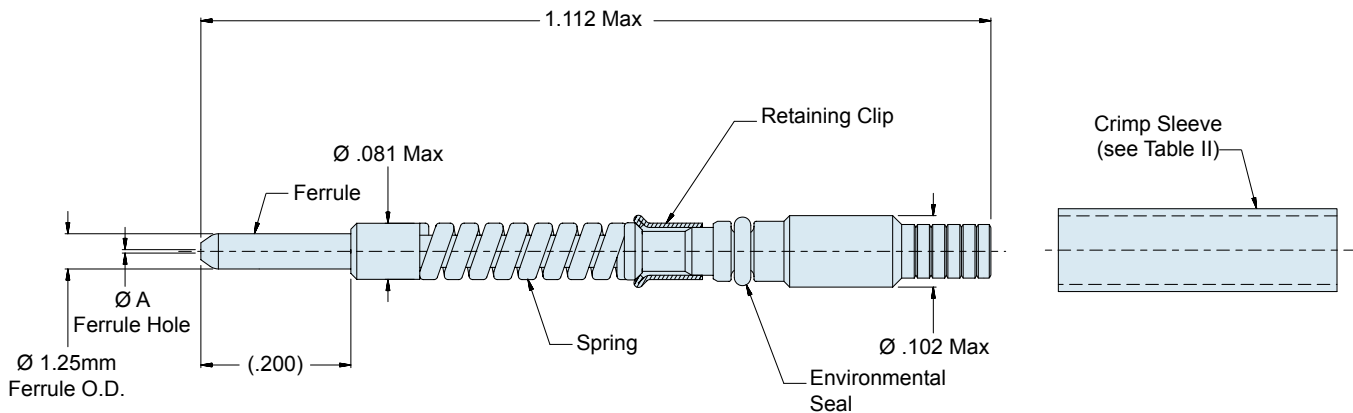
Connector Shell Size	11	13	15	23
M28876 Cavity Count	2	4	6/8	18/31
Glenair High Density Cavity Count	4	6	16	52

Glenair High Density Versus D38999

Connector Shell Size	11	13	15	17	19	21	23	25
D38999 Cavity Count	2	4	5	8	11	16	21	29/37
Glenair High Density Cavity Count	4	6	16	22	30	40	52	70

Size 18 Non-Keyed Front Release Glenair High Density (GHD) Genderless Terminus


The Glenair High Density Fiber Optic Connector 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 genderless 18 gauge GHD contact delivers nearly double the density of M28876 and D38999 with superior optical performance.


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

Tools and Accessories/Assembly 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 complete termination instructions.

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



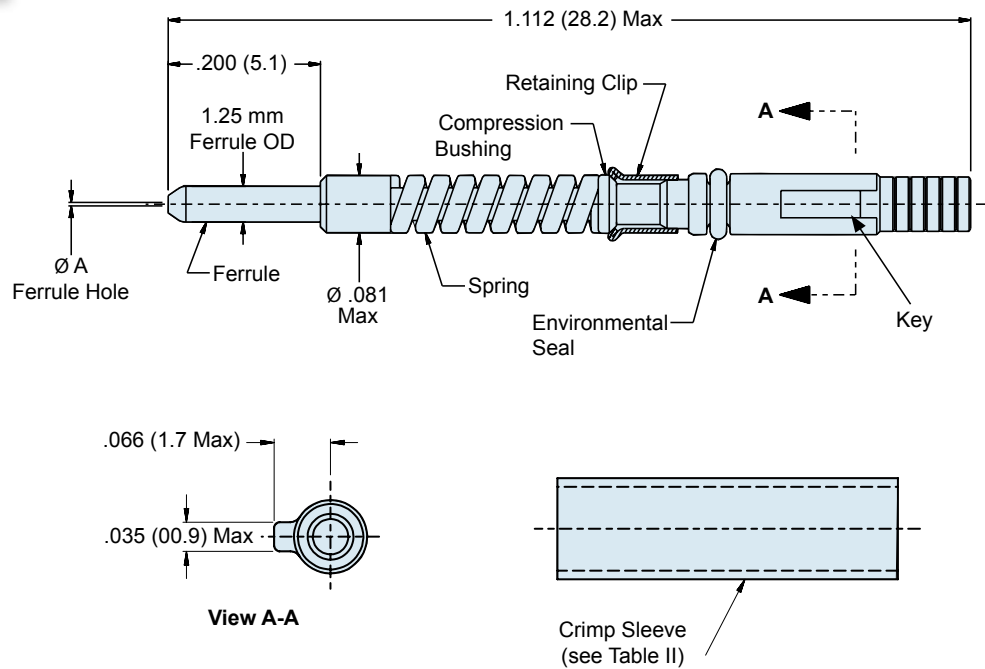
Part Number	ØA (Microns)	Typ. Fiber Type
181-056-1250C	125.0	Single Mode
181-056-1255C	125.5	Single Mode
181-056-1260C	126.0	Single Mode OR Multi Mode
181-056-1270C	127.0	Multi Mode
181-056-1420C	142.0	Multi Mode
181-056-1450C	145.0	Multi Mode
181-056-1560C	156.0	Multi Mode
181-056-1570C	157.0	Multi Mode
181-056-1730C	173.0	Multi Mode
181-056-1750C	175.0	Multi Mode
181-056-2360C	236.0	Multi Mode
181-056-2860C	286.0	Multi Mode
181-056-4480C	448.0	Multi Mode



CRIMP SLEEVE	
Part Number	Description
265-002	Crimp Sleeve Ø2.2mm Max Jacket

**Size 18 Glenair High Density (GHD) Fiber Optic Genderless Terminus,
Keyed for APC Polish**


The Glenair High Density Fiber Optic Connector 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 181-047 version is equipped with a single keying feature for APC polish.


Material and Finish

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

Tools and Accessories

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 complete termination instructions.

181-047
GHD • Glenair High Density
Fiber Optic Genderless Terminus
Size 18 Keyed Terminus for APC Polish

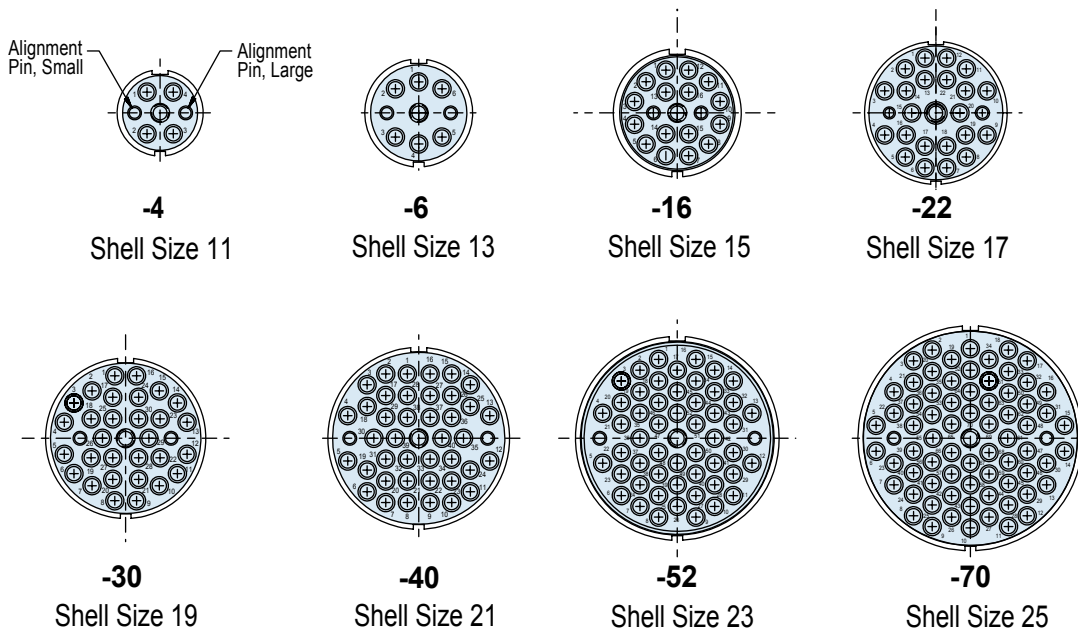


Part Number	ØA (Microns)	Typ. Fiber Type
181-047-1250C	125.0	Single Mode
181-047-1255C	125.5	Single Mode
181-047-1260C	126.0	Single Mode OR Multi Mode
181-047-1270C	127.0	Multi Mode
181-047-1420C	142.0	Multi Mode
181-047-1450C	145.0	Multi Mode
181-047-1560C	156.0	Multi Mode
181-047-1570C	157.0	Multi Mode
181-047-1730C	173.0	Multi Mode
181-047-1750C	175.0	Multi Mode
181-047-2360C	236.0	Multi Mode
181-047-2860C	286.0	Multi Mode
181-047-4480C	448.0	Multi Mode



CRIMP SLEEVE	
Part Number	Description
265-002	Crimp Sleeve Ø2.2mm Max Jacket

New Contact Arrangements For Mod 38999 Style



Marking for Plug Side, Removable Face (ASR), Shown
Receptacle Side - Opposite

NOTE: Each arrangement includes two guide pins and a threaded center jack post. The jack post is located at the center point of the X and Y axis. The alignment pins are located at the outer most points on the X axis.

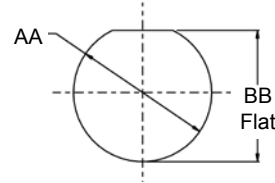
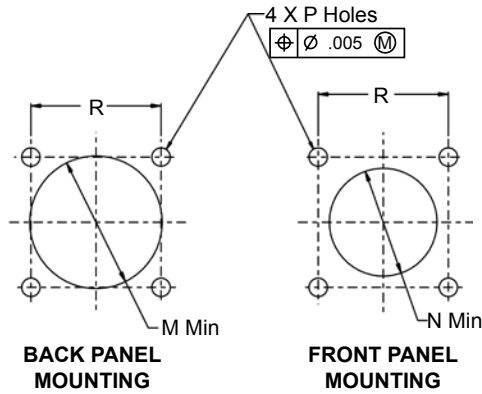
TABLE I: MATERIAL AND FINISH		
SYM	MATERIAL	FINISH DESCRIPTION
M*	Aluminum	Electroless Nickel
MT		Nickel - PTFE
NF		Cadmium, Olive Drab
ZNU		Zinc-Nickel, Black
XM*	Composite	Electroless Nickel
XMT		Nickel - PTFE
XO		No Plating
XW		Cadmium, Olive Drab
XZN		Zinc-Nickel, Black
ZL*	Stainless Steel	Electro-Deposited Nickel
Z1*		Passivate

*RoHS Compliant

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

"XO" Finish composite Jam Nut Receptacle is supplied with Unplated Composite Jam Nut and accommodates .093 maximum panel thickness.

180-122
**GHD • Glenair High Density
 Fiber Optic Connection System
 Panel Cut-Out and Mounting Holes**



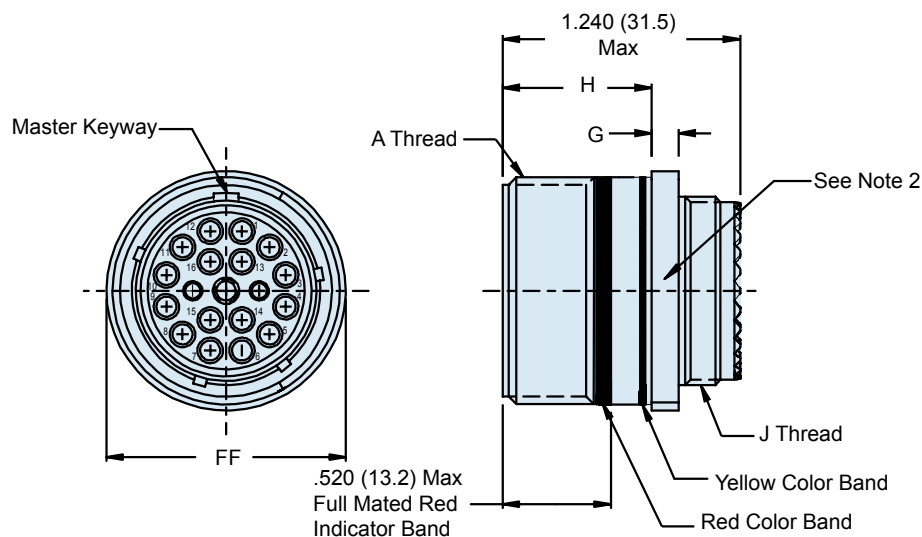
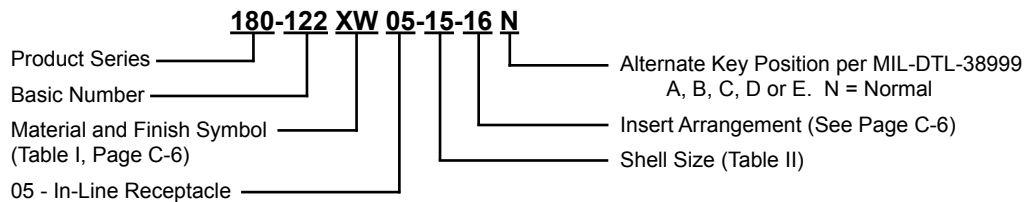
**RECOMMENDED
 PANEL CUT-OUT**

(See Table V)

**RECOMMENDED MOUNTING HOLES
 FOR WALL MOUNT RECEPTACLES**
 (See Table III)

TABLE III: MOUNTING HOLES FOR WALL-MOUNT RECEPTACLES					
Shell Size Code	Shell Size	M Dia Min	N Dia Min	P Holes	R 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)

TABLE V: PANEL CUT-OUT			
Shell Size Code	Shell Size	AA Dia Min	BB Flat
B	11	.835 (21.2) .825 (20.9)	.771 (19.6) .761 (19.3)
C	13	1.020 (25.9) 1.010 (25.7)	.955 (24.3) .945 (24.0)
D	15	1.145 (29.1) 1.135 (28.8)	1.085 (27.6) 1.075 (27.3)
E	17	1.270 (32.3) 1.260 (32.0)	1.210 (30.7) 1.200 (30.5)
F	19	1.395 (35.4) 1.385 (35.2)	1.335 (33.9) 1.325 (33.7)
G	21	1.520 (38.6) 1.510 (38.4)	1.460 (37.1) 1.450 (36.8)
H	23	1.645 (41.8) 1.635 (41.5)	1.585 (40.3) 1.575 (40.0)
J	25	1.770 (45.0) 1.760 (44.7)	1.710 (43.4) 1.700 (43.2)



05 - IN-LINE RECEPTACLE

APPLICATION NOTES

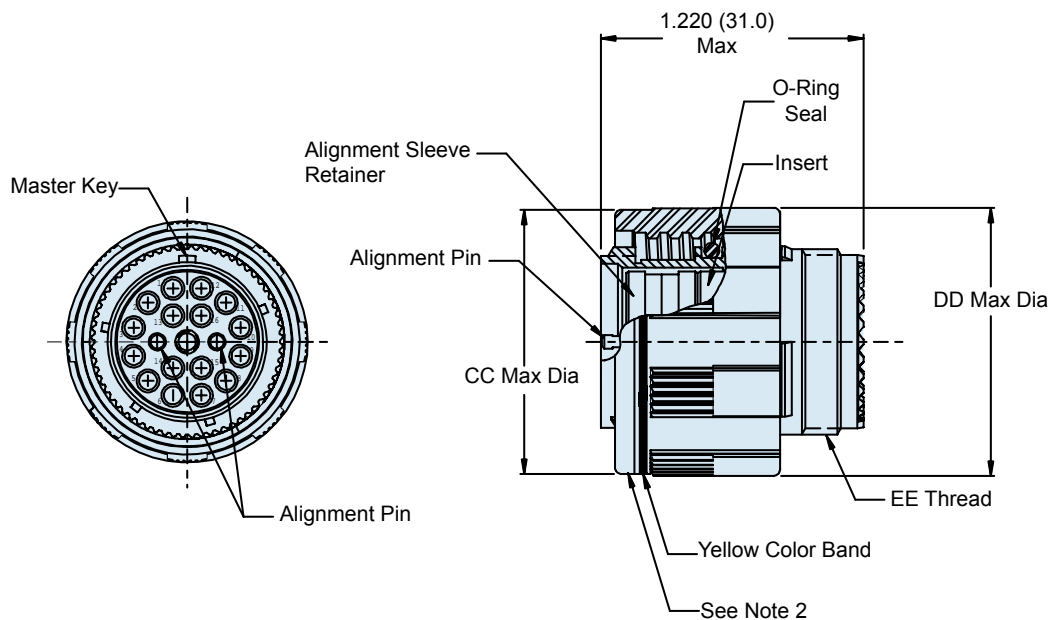
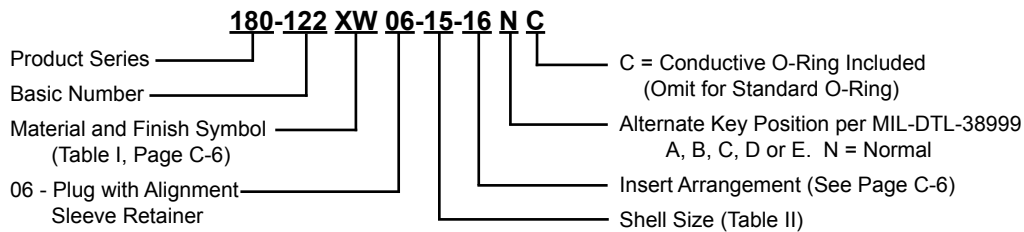
- Material/ Finishes:
Shell - High grade engineering thermoplastic/
See Table I, Page C-6.
Insulators - High grade rigid dielectric/N.A.
Seals - Fluorosilicone/N.A.
- Assembly to be identified with Glenair's name, part number and date code, space permitting.
- For appropriate Glenair terminus part numbers see Glenair drawing 181-047 (keyed terminus for APC polish, page C-4) or 181-041 (tunable terminus, page C-2).
- Metric dimensions (mm) are indicated in parentheses.

180-122 (05)
GHD • Glenair High Density
Fiber Optic Connection System
In-Line Receptacle Connector • MIL-DTL-38999 Style



TABLE II: SHELL SIZE

Shell Size Code	Shell Size	A Thread	G	H	J Thread	FF Dia
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)



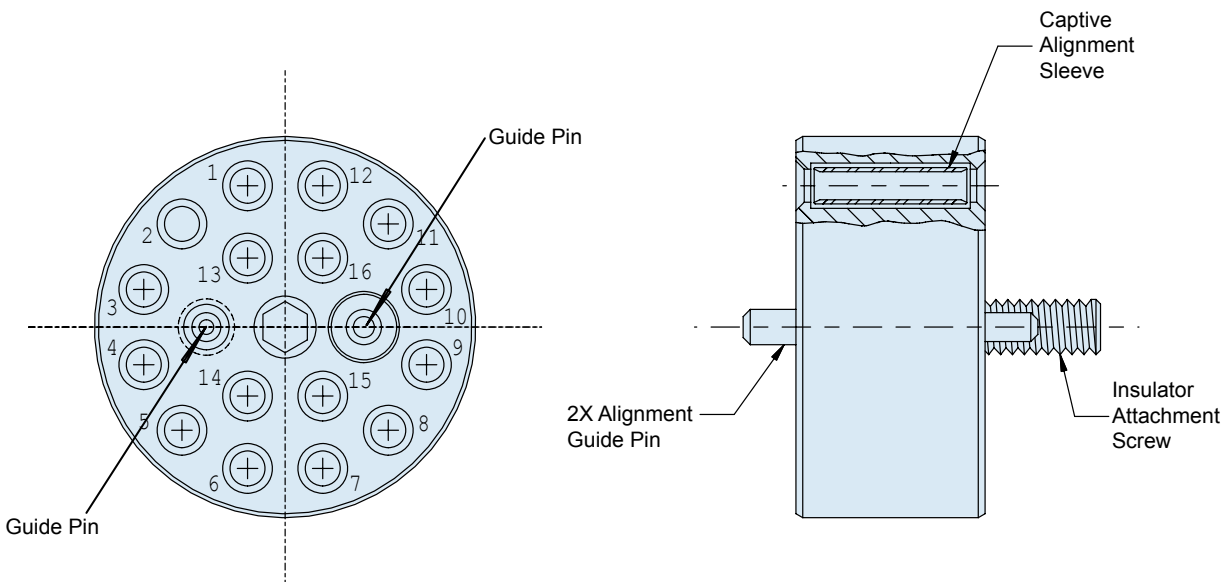
06 - PLUG

APPLICATION NOTES

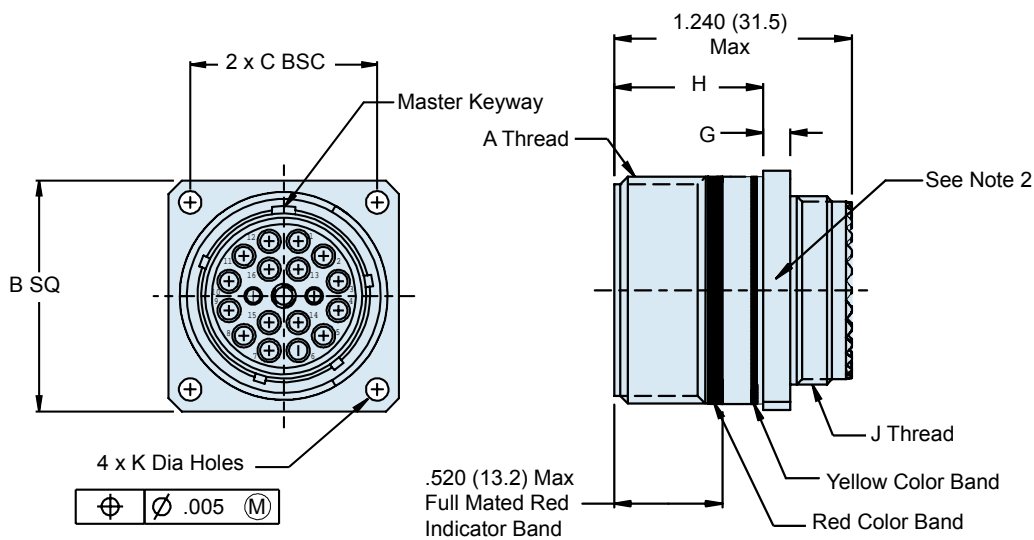
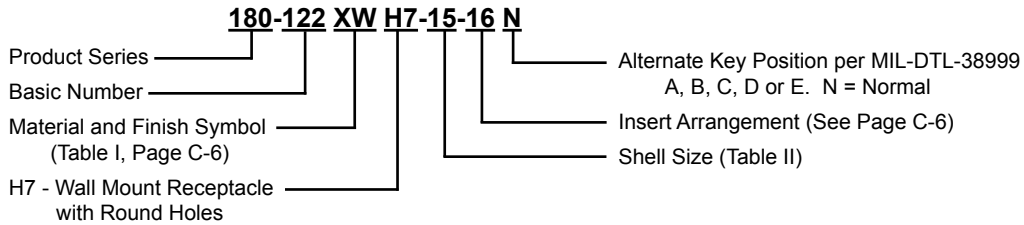
- Material/ Finishes:
Shells, Barrel - High grade engineering thermoplastic/
See Table I, Page C-6.
Coupling nut/jam nut - High grade engineering thermoplastic/N.A.
Insulators - High grade rigid dielectric/N.A.
Alignment Sleeve Retainer - Aluminum alloy/black anodized or composite (see detailed view, opposite page).
Seals - Fluorosilicone/N.A.
- Assembly to be identified with Glenair's name, part number and date code, space permitting.
- For appropriate Glenair terminus part numbers see Glenair drawing 181-047 (keyed terminus for APC polish, page C-4) or 181-041 (tunable terminus, page C-2).
- Consult factory for addition of RFI spring.
- Metric dimensions (mm) are indicated in parentheses.

TABLE II: SHELL SIZE

Shell Size Code	Shell Size	CC Max Dia	DD Max Dia	EE Thread
B	11	.929 (23.6)	.984 (25.0)	M15 X 1.0-6g 0.100R
C	13	1.110 (28.2)	1.157 (29.4)	M18 X 1.0-6g 0.100R
D	15	1.232 (31.3)	1.280 (32.5)	M22 X 1.0-6g 0.100R
E	17	1.358 (34.5)	1.406 (35.7)	M25 X 1.0-6g 0.100R
F	19	1.469 (37.3)	1.516 (38.5)	M28 X 1.0-6g 0.100R
G	21	1.594 (40.5)	1.642 (41.7)	M31 X 1.0-6g 0.100R
H	23	1.720 (43.8)	1.768 (44.9)	M34 X 1.0-6g 0.100R
J	25	1.843 (46.8)	1.890 (48.0)	M37 X 1.0-6g 0.100R



**Detailed View of
 Removable Alignment Sleeve
 Retainer**



APPLICATION NOTES

1. Material/ Finishes:
 Shell - High grade engineering thermoplastic/
 See Table I, Page C-6.
 Insulators - High grade rigid dielectric/N.A.
 Seals - Fluorosilicone/N.A.
2. Assembly to be identified with Glenair's name, part number and date code, space permitting.
3. For appropriate Glenair terminus part numbers see Glenair drawing 181-047 (keyed terminus for APC polish, page C-4) or 181-041 (tunable terminus, page C-2).
4. Metric dimensions (mm) are indicated in parentheses.

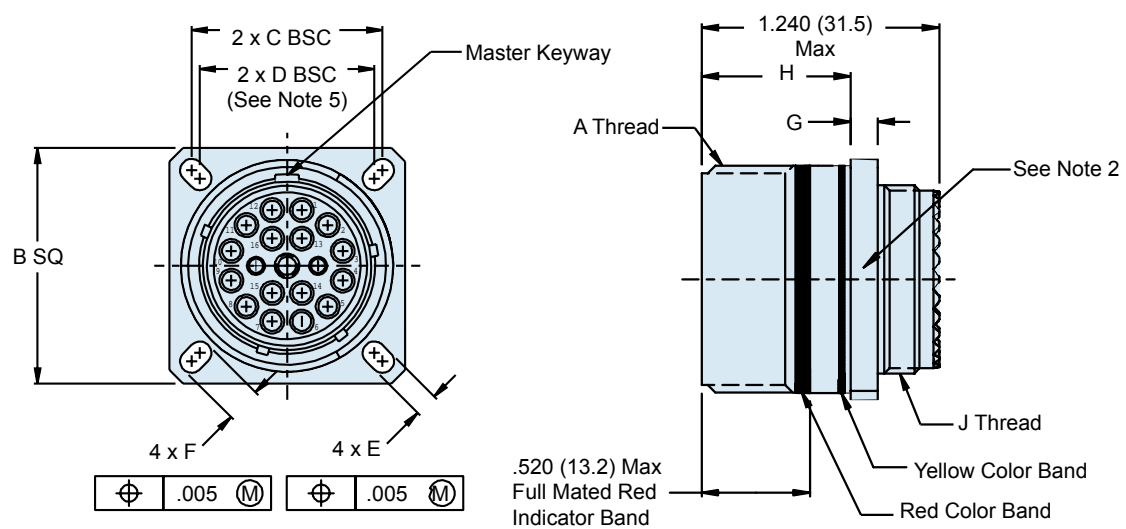
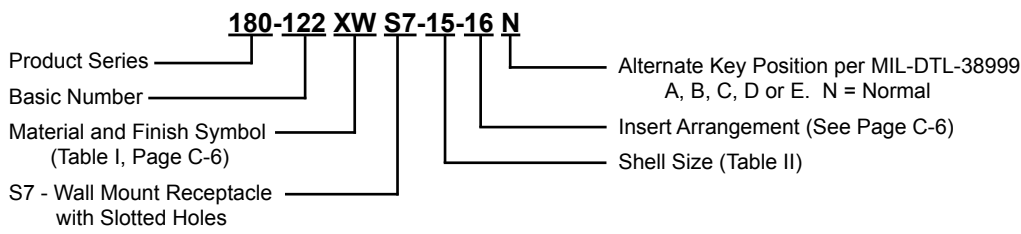
180-122 (H7)
GHD • Glenair High Density
Fiber Optic Connection System
D38999 Style Square Flange Receptacle with Round Holes



TABLE II: SHELL SIZE

Shell Size Code	Shell Size	A Thread	B SQ	C BSC	G	H	J Thread	K Dia 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)

180-122 (S7)
GHD • Glenair High Density
Fiber Optic Connection System
Square Flange with Slotted Holes • MIL-DTL-38999 Style



S7 - WALL MOUNT RECEPTACLE WITH SLOTTED HOLES

APPLICATION NOTES

- Material/ Finishes:
 Shell - High grade engineering thermoplastic/
 See Table I, Page C-6.
 Insulators - High grade rigid dielectric/N.A.
 Alignment Sleeve Retainer - Aluminum alloy/black anodized
 Seals - Fluorosilicone/N.A.
- Assembly to be identified with Glenair's name, part number and date code, space permitting.
- For appropriate Glenair terminus part numbers see Glenair drawing 181-047 (keyed terminus for APC polish, page C-4) or 181-041 (tunable terminus, page C-2).
- Front panel only.
- Metric dimensions (mm) are indicated in parentheses.

180-122 (S7)
GHD • Glenair High Density
Fiber Optic Connection System
Square Flange with Slotted Holes • MIL-DTL-38999 Style



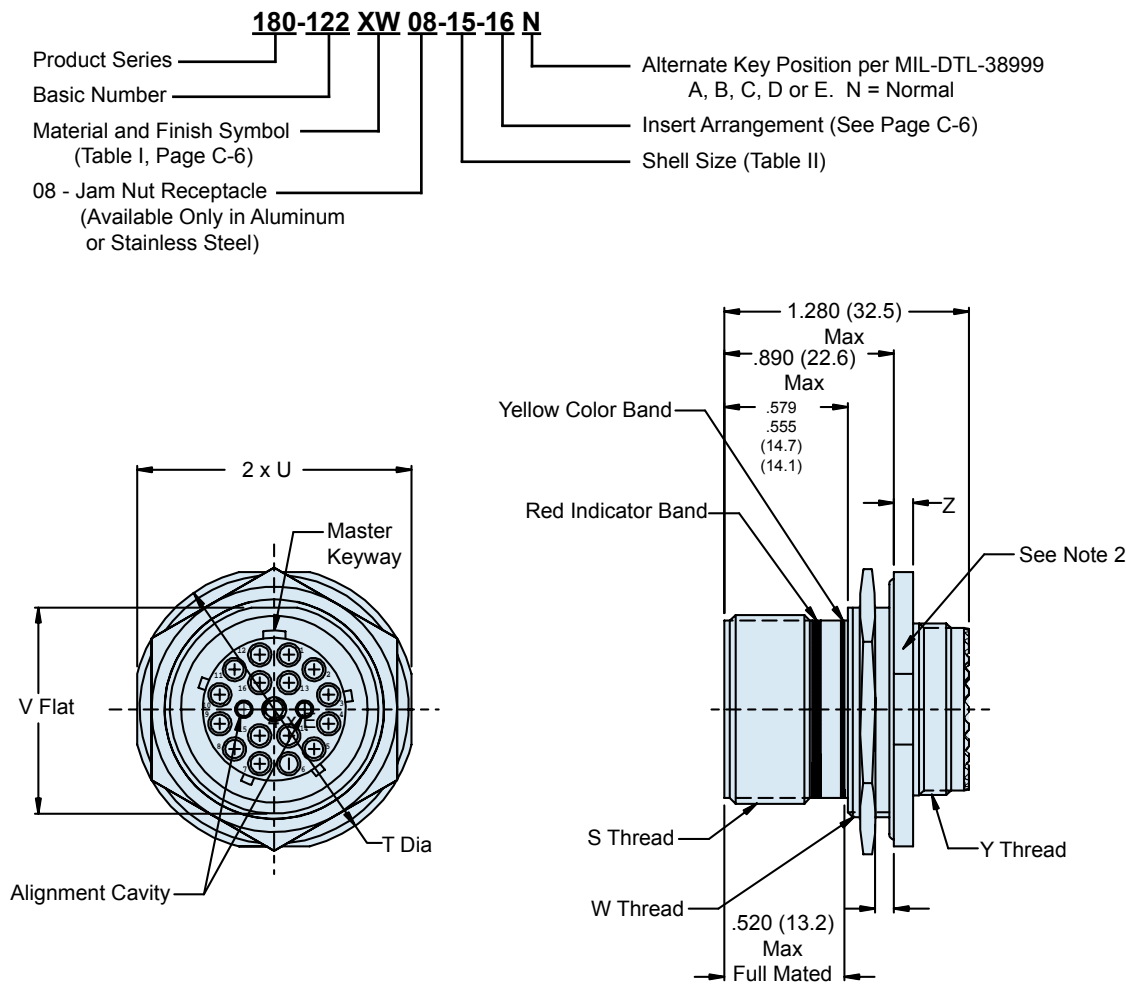
TABLE II: SHELL SIZE

Shell Size Code	Shell Size	A Thread	B SQ	C BSC	D BSC*	E	F	G	H
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)
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)
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)
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)
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)
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)
H	23	1.5000 -.1P -.3L-TS-2A	1.701 (43.2) 1.677 (42.6)	1.375 (34.9)	1.250 (31.8)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)
J	25	1.6250 -.1P -.3L-TS-2A	1.823 (46.3) 1.799 (45.7)	1.500 (38.1)	1.375 (34.9)	.136 (3.5) .120 (3.0)	.202 (5.1) .186 (4.7)	.171 (4.3) .083 (2.1)	.791 (20.1) .736 (18.7)

*Front Panel Mount Only (See Note 4)

TABLE II: SHELL SIZE
(Continued)

Shell Size Code	Shell Size	J Thread
B	11	M15 X 1.0-6g 0.100R
C	13	M18 X 1.0-6g 0.100R
D	15	M22 X 1.0-6g 0.100R
E	17	M25 X 1.0-6g 0.100R
F	19	M28 X 1.0-6g 0.100R
G	21	M31 X 1.0-6g 0.100R
H	23	M34 X 1.0-6g 0.100R
J	25	M37 X 1.0-6g 0.100R



08 - JAM NUT MOUNT RECEPTACLE

APPLICATION NOTES

1. Material/ Finishes:
 Shell - High grade engineering thermoplastic/
 See Table I, Page C-6.
 Insulators - High grade rigid dielectric/N.A.
 Seals - Fluorosilicone/N.A.
2. Assembly to be identified with Glenair's name, part number and date code, space permitting.
3. Modified major diameter 31.800 - 31.950 (1.252 - 1.257).
4. For appropriate Glenair terminus part numbers see Glenair drawing 181-047 (keyed terminus for APC polish, page C-4) or 181-041 (tunable terminus, page C-2).
5. Metric dimensions (mm) are indicated in parentheses.
6. Jam Nut for composite Jam Nut Mount Receptacle is Aluminum and plated same as connector shell.
7. "XO" Finish composite Jam Nut Receptacle is supplied with Unplated Composite Jam Nut and accommodates .093 maximum panel thickness.

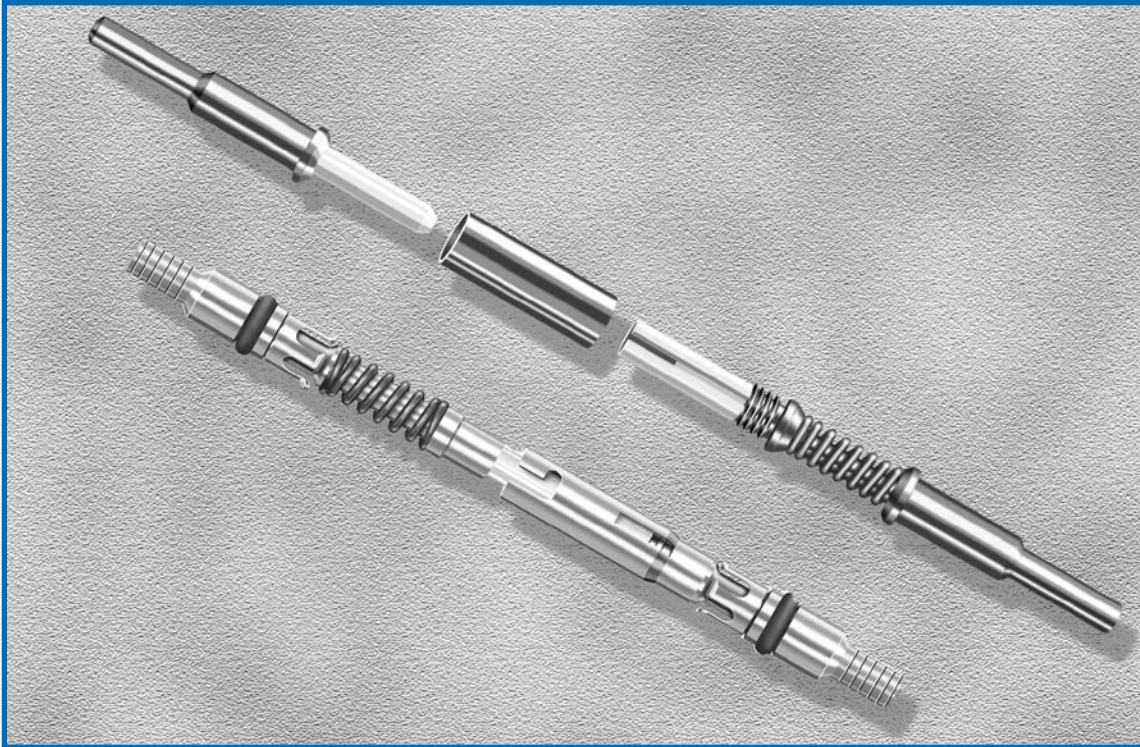
180-122 (08)
GHD • Glenair High Density
Fiber Optic Connection System
Jam-Nut Mount Receptacle Connector • MIL-DTL-38999 Style



TABLE I: SHELL SIZE								
Shell Size Code	Shell Size	S Thread	T Dia	U	V	W Thread	Y Thread	Z
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)
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)

*See Note 3

Tired of Waiting an Eternity for a Fiber Optic Terminus



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