

Fiber Optic Solutions for Broadcast Applications



The History of Fiber Optics in Broadcast

The first television signals were broadcast in 1928 and received on screens measuring only an inch and a half square. Since its inception, the broadcast television industry has led the forward momentum of technology to transmit and receive audio/video signals. This is partially due to the demand for newer and higher quality transmissions for large media events, such as the Olympics®, the Super Bowl®, the World Cup®, etc. Large scale use of fiber optics in broadcast began in the mid-1980's. Today, fiber optics is used in all facets of the production and distribution of audio and video signals.



With the advent of digital video in the 1990s, fiber optics continued to expand in the broadcast market. Some of the applications include: real time studio monitoring, general broadcast (News, Sports, Media Events), post production, station networking, and multi-channel distribution, just to name a few. In June of 2009, the transition to 100% DTV/HDTV was implemented in the United States. The growing use of HDTV cameras at outdoor locations and events created the need to transport signals with a bit rate of 3 Gbps over long distances. Since the traditional coax type copper cables can only transport these signals about 150 meters without a signal booster or amplifier, fiber optics was the natural choice to bridge the gap. Fiber optics offers not only greater bandwidth over longer distances, but also a better signal to noise ratio, greater immunity to interference, and reduced size, footprint and weight compared to traditional copper solutions. The use of single mode fiber offers nearly unlimited bandwidth, allowing the ability to expand with the growing technology.

All of these factors ensure that the use of fiber optics in the broadcast industry will only continue to grow exponentially. Broadcast television producers will continue to push the envelope for increasing bandwidth and range. A vast array of equipment is utilized to capture all aspects of the event, such as relaying images, audio and data from a plethora of cameras and microphones back to the production suite in the Outside Broadcast (OB) truck.

Amphenol Fiber Systems International's (AFSI) outside plant and in-studio connectivity solutions are playing an increasingly important role in the live-event broadcast arena. From PGA Golf Tournaments to NASCAR tracks, from rock concerts to the Olympics, AFSI's high reliability fiber optic connectors bring the events to you at the speed of light.

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Amphenol Fiber Systems International (AFSI) offers the most complete suite of fiber optic solutions for the broadcast market available anywhere. Our broadcast products have been used in Final Four®, Super Bowl®, World Cup® and Olympic® events. We specialize in harsh environment fiber optic connectors and cable assemblies, so you can count on us to provide the best solution for your broadcast application. Our cable assemblies are built in-house in our ISO 9001:2000 certified facility in Allen, TX. You can rely on their rugged construction and dependability year after year because they are built by our fiber experts.



AFSI designs, manufactures, markets, and supports reliable and innovative fiber optic interconnect solutions optimized to withstand the harsh environments of the broadcast industry. After nearly two decades in business, AFSI continues to maintain its position as a global leader in fiber optic interconnect components and systems. Wherever there is a need for superior cost-effective fiber optic systems and products able to withstand demanding environments, you can rely on AFSI for engineering know-how, top-quality products and expert technical support.

Industries Served

AFSI is a global leader in rugged fiber optic interconnect and optical system technologies. Markets or industries utilizing AFSI's products include:



Broadcast



Oil & Gas



Shipboard



Military Ground Systems



Mining










Avionics

Broadcast Connectors Quick Reference

110 Series - SMPTE 304M Connectors

More info on Pgs 5-12








	110-1000-125-C	In Line Plug w/Rubber Cover and Cap
	110-6500-125-C	In Line Receptacle w/Rubber Cover and Cap
	110-6100-125-R	Fixed Receptacle Rear Square Flange
	110-6000-125-R	Fixed Receptacle Front Square Flange
	110-6200-125-R	Flanged Fixed Rec w/Strain Relief
	110-2000-125-R	Flanged Fixed Plug
	110-2200-125-R	Flanged Fixed Plug w/Strain Relief

FS12 Pierside Fiber Optic Connectors

More info on Pgs 16-19





	FS12-1000	12-CH Plug
	FS12-6000	12-CH Receptacle Flanged
	FS12-8000	12-CH Receptacle Rear Jam Nut
	FS12-8280	12-CH Receptacle SRR
	FS12-8080	12-CH Receptacle Front Jam Nut



109 Series - SMPTE 358 Connectors




More info on Pgs 14-15

	1091000	4-CH Hermaphroditic Plug
	1098080	4-CH Hermaphroditic Receptacle

TFOCA-II® 4-Channel Fiber Optic Connectors

More info on Pg 20





	FS4H1000	4-CH Hermaphroditic Plug
	FS4H6000	4-CH Hermaphroditic Rec Flange Ext Mount
	FS4H8000	4-CH Hermaphroditic Jam Nut Receptacle

mTACH Fiber Optic Connectors

More info on Pgs 24-25



	mTACH1000	mTACH Plug
	mTACH6000	mTACH Flange Mount Receptacle

TACBeam Fiber Optic Connectors

More info on Pgs 21-23



	EB4H1000	TACBeam Plug Assembly
	EB4H8000	TACBeam Jam Nut Receptacle Assembly
	EB4H8280	TACBeam Strain Relief Receptacle
	EB4H6000	TACBeam Flange Mount Receptacle
	EB4H6200	TACBeam Flange Mount Rec w/ Strain Relief

110 Series - SMPTE 304M Connectors

110-1000-125-C
In Line Plug

110-6500-125-C
In Line Receptacle

110-6100-125-R
Fixed Receptacle
Rear Square Flange

110-6000-125-R
Fixed Receptacle
Front Square Flange

110-2200-125-R
Flanged Fixed Plug
w/ Strain Relief

110-2000-125-R
Flanged Fixed Plug

110-6200-125-R
Flanged Fixed Receptacle
w/ Strain Relief



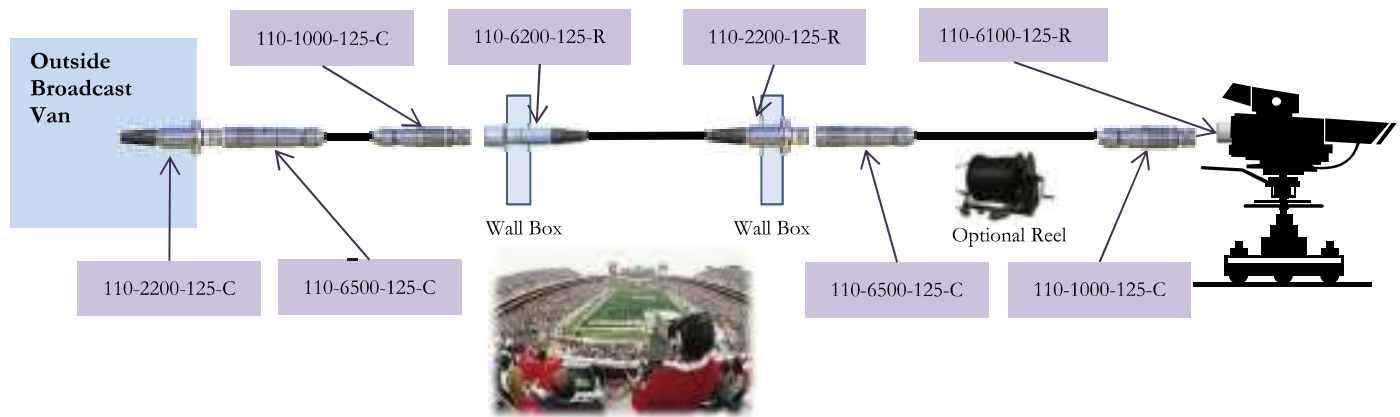
In 1998, the Society of Motion Picture and Television Engineers (SMPTE) introduced Standards 304M and 311M. These standards were issued to cover the hybrid fiber interface and cable format commonly used in HD television broadcasting and video equipment. These hybrid connectors contain a combination of two single mode fiber optic contacts, two 600VAC electrical contacts and two signal contacts. It also contains dimensional tolerances pertaining to the non-destructive mating and demating of the electrical and optical contacts as well as functional operability of the electrical interface. The functional operability of the optical interface is greatly dependent on production variables such as proper fiber

preparation, polish and termination. Therefore, they are not covered by this standard. SMPTE connectors and cable assemblies have quickly become the industry standard for HDTV camera applications.

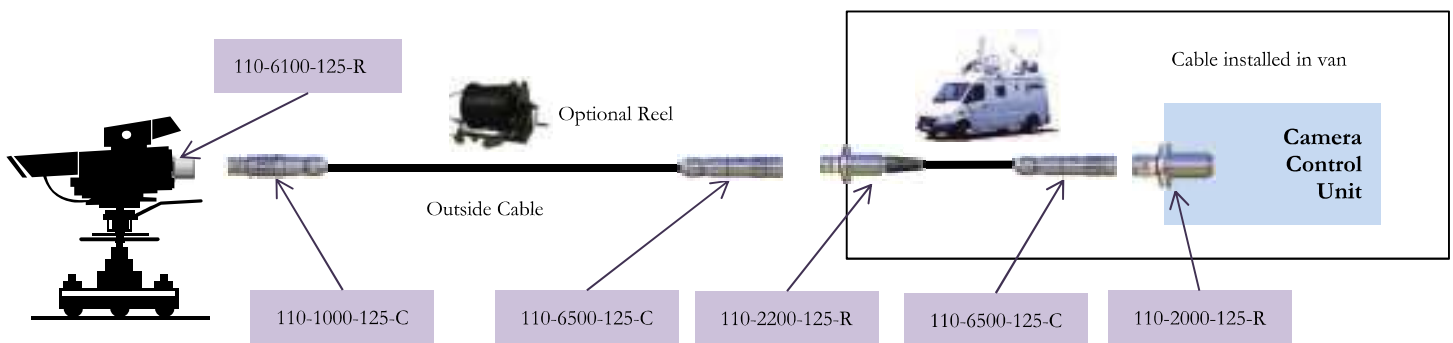
Amphenol Fiber Systems International (AFSI) offers a complete suite of SMPTE solutions for the broadcast market including plugs, receptacles, termini and cable assemblies. We can build custom cable assemblies specific to your application to your specifications. Or, our engineers can listen to your needs and design a custom solution for you. We will provide a custom drawing of your assembly for your approval prior to manufacturing.

SMPTE Application Diagrams

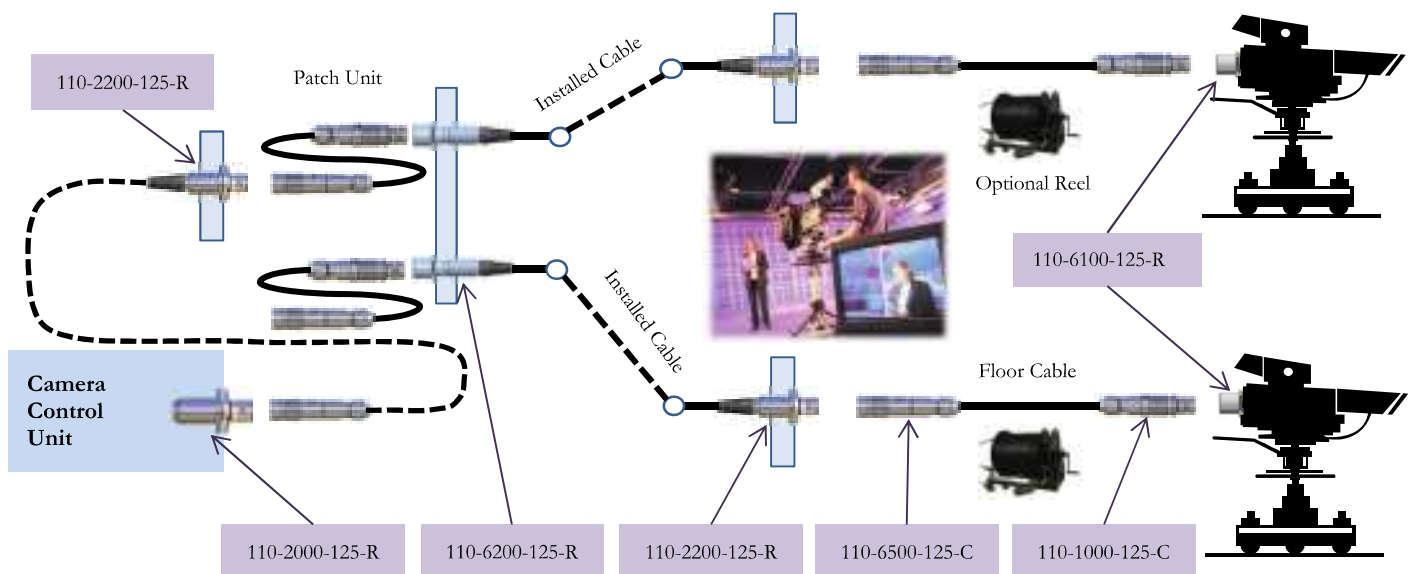
Stadium Application



Outside Broadcast



Studio Application



110 Series - SMPTE 304M Connectors



110 Series MG 1235



*Cable Assembly with
110 Connectors*

110 Series Connectors

Amphenol Fiber Systems International (AFSI) introduces a new line of 110 Series connectors conforming to the SMPTE 304M Standard. These hybrid connectors are designed for use with high definition broadcast television cameras used worldwide for the production and transmission of high definition TV programming.

The 110 Series connectors feature two fiber optic termini and four electrical contacts. The fiber termini support both single mode and multimode fibers, while the two auxiliary electrical contacts permit supply of power remotely to the camera at long distances from the studio, control van or Camera Control Unit. Two additional low voltage electrical contacts are provided for communication purposes. The connectors are designed for use in conjunction with SMPTE 311M Standard cables.

The connectors are fabricated from stainless steel to withstand corrosive elements when exposed to extreme harsh outdoor environments. This construction also eliminates flaking of the plating material that can contaminate the endface on lower cost connectors. In addition, they are sealed to an IP68 rating to block out ingress of damaging dirt, dust and moisture. The robust shells are designed with thick walls to prevent damage from rough handling during outdoor deployment at venues such as professional sports arenas. Dust caps are available to protect against contamination of the interfaces. The connectors are designed for easy termination in the field.

While intended primarily for use for HDTV broadcast applications, these connectors are ideal for other applications that call for rugged hybrid fiber optic connections. Optional materials, finishes, inserts and keying configurations are available as custom configurations. The connectors are also offered with optional custom cable attachments allowing use with other cable structures.

Applications

- HDTV broadcast cameras
- Studios
- Outside broadcast vehicles
- Sports arenas
- Auditoria

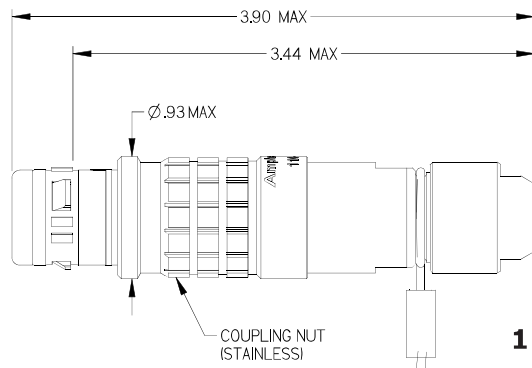
Features & Benefits

- SMPTE 304M Compliant
- Hybrid (2-ch SM fiber + 2HV + 2LV)
- Push Pull quick connect/disconnect mechanism for easy/quick mating
- Multiple key design for easy blind mating
- Low insertion loss
- High back reflection with super PC polish
- Plug and socket configuration for easy daisy-chaining
- Designed for excellent optical performance over the harshest environmental conditions
- 360 degree shielding for full EMI screening
- Plug shell has color code band
- Designed for easy field termination
- All stainless steel construction eliminates plating debris

*Termini sold separately, see page 26

110 Series Plug Product Drawings

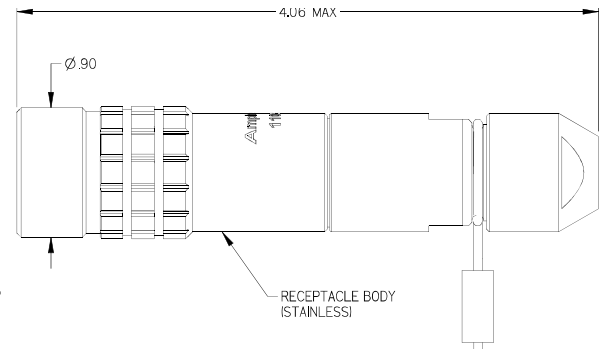
110-1000 Male Plug



110-1000-XXX-X

TERMINI OPTIONS
000 = NO TERMINI INCLUDED
125 = HIGH PERFORMANCE

110-6500 Female Plug

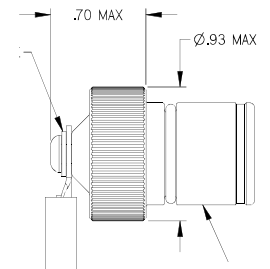
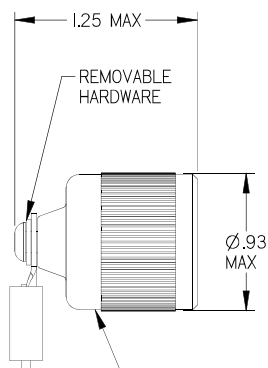


110-6500-XXX-X

TERMINI OPTIONS
000 = NO TERMINI INCLUDED
125 = HIGH PERFORMANCE

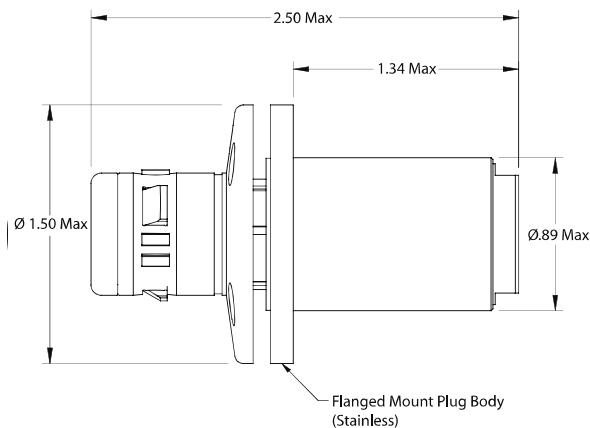
DUST CAP OPTIONS
M = METAL CAP
Z = NO CAP
R = RUBBER CAP
C = RUBBER COVER & CAP

DUST CAP OPTIONS
M = METAL CAP
Z = NO CAP
R = RUBBER CAP
C = RUBBER COVER & CAP



*Termini sold separately, see page 26

110-2000 Fixed Plug with Flange

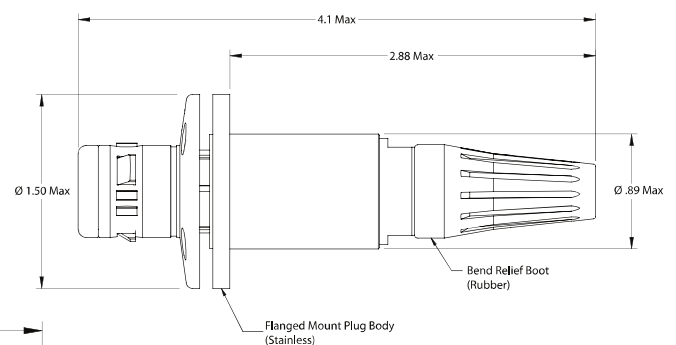


110-2000-XXX-X

TERMINI OPTIONS
000 = NO TERMINI INCLUDED
125 = HIGH PERFORMANCE

DUST CAP OPTIONS
M = METAL CAP
R = RUBBER CAP
Z = NO CAP

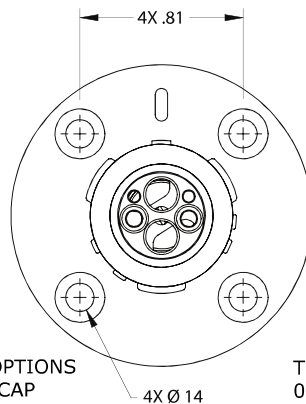
110-2200 Flanged Fixed Plug with Strain Relief



110-2200-XXX-X

TERMINI OPTIONS
000 = NO TERMINI INCLUDED
125 = HIGH PERFORMANCE

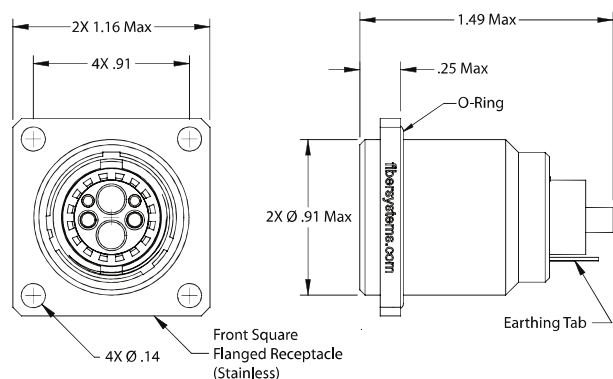
DUST CAP OPTIONS
M = METAL CAP
R = RUBBER CAP
Z = NO CAP



*Termini sold separately, see page 26

110 Series Receptacles Product Drawings

110-6000 Fixed Receptacle Assy. Front Square Flange



110-6000-XXX-X

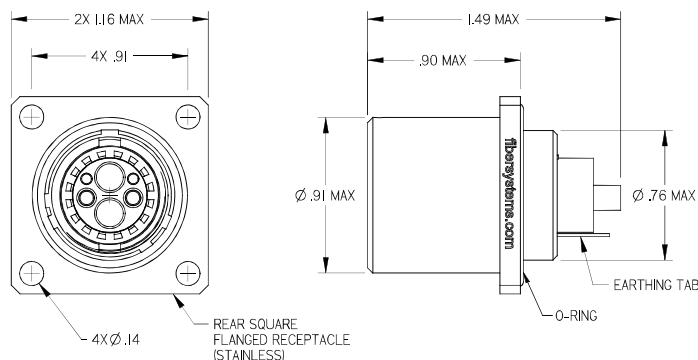
TERMINI OPTIONS

000 = NO TERMINI INCLUDED
125 = HIGH PERFORMANCE

DUST CAP OPTIONS

M = METAL CAP
R = RUBBER CAP
Z = NO CAP

110-6100 Fixed Receptacle Assy. Rear Square Flange



110-6100-XXX-X

TERMINI OPTIONS

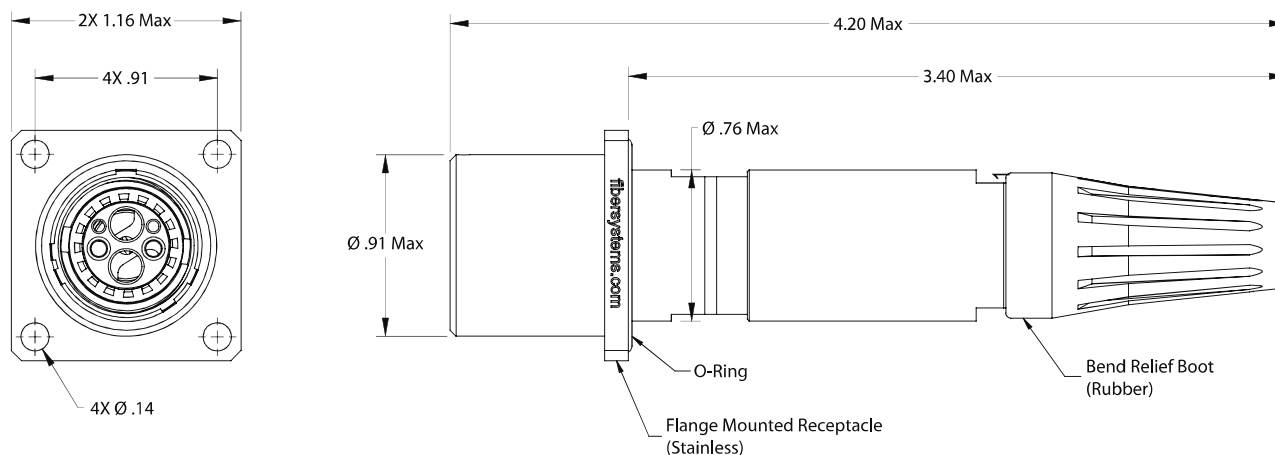
000 = NO TERMINI INCLUDED
125 = HIGH PERFORMANCE

DUST CAP OPTIONS

M = METAL CAP
R = RUBBER CAP
Z = NO CAP

*Termini sold separately, see page 26

110-6200 Flange Mounted Receptacles with Strain Relief



110-6200-XXX-X

TERMINI OPTIONS

000 = NO TERMINI INCLUDED
125 = HIGH PERFORMANCE

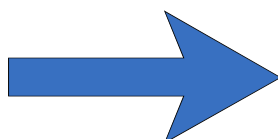
DUST CAP OPTIONS

M = METAL CAP
R = RUBBER CAP
Z = NO CAP

*Termini sold separately, see page 26

Cross Reference Chart

AFSI to Lemo SMPTE Cross Reference		
Description	Lemo Equiv	AFSI Part #
Free Cable Plug	FUW Series	110-1000 Series
Free Cable Receptacle	PUW Series	110-6500 Series
Panel Rec, Rear Flange	EDW Series	110-6100 Series
Panel Rec, Front Flange	EBW Series	110-6000 Series
Panel Plug	FXW Series	110-2000 Series
Panel Plug w/Cable Adapter	FMW Series	110-2200 Series
Panel Rec w/Cable Adapter	PBW Series	110-6200 Series
Rubber Plug Boot w/Dust Cap	GMF Series	110-J1000 Series
Rubber Rec Boot w/ Dust Cap	GMP Series	110-J6500 Series
Plug Rubber Dust Cap Panel	BHA Series	110-DPP
Plug Rubber Dust Cap Connector	BFG Series	110-DPC
Rec Rubber Dust Cap Panel	BRA Series	110-DSP
Rec Rubber Dust Cap Connector	BRF Series	110-DSC
Terminus Socket	PSS.F2BA2.LCT10/LCE30	110-TS-125
Terminus Pin	FSS.F2.BA2.LCT10/LCE30	110-TP-125
Terminus/Captivator Extraction Tool	DCS.F2.035.PN	110-TET
Elec Contact Extraction Tool 14 AWG	DCC.91.090.5LA	110-ECET-14
Elec Contact Extraction Tool 20 AWG	DCC.91.070.5LA	110-ES-14
Electrical Socket 14 AWG	EGW.3K.666.ZZM	110-ES-14
Electrical Socket 20 AWG	EGG.3B.660.ZZM	110-ES-20
Electrical Pin 14 AWG	FGW.3K.565.ZZC	110-EP-14
Electrical Pin 20 AWG	FGG.3B.560.ZZC	110-EP-20



LEMO® is a registered trademark

LimeLight Cable Assemblies SMPTE 304M and 311M Compliant



Cable assembly incorporating SMPTE 304M Standard compliant connector and 311M Standard cable

About SMPTE 304M Connector and 311M Cable Assembly

Amphenol Fiber Systems International's (AFSI) SMPTE 304M compliant (110 Series) fiber optic connectors and 311M compliant cable assemblies provide rugged and superior performance for broadcast applications. AFSI connectors and cable assemblies are designed to be the most rugged in the industry, are easy to maintain and provide optimal optical performance.

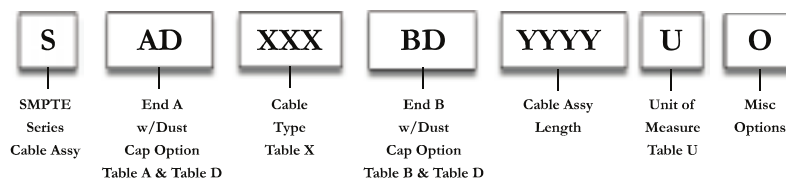
AFSI's line of LimeLight cable assemblies use our SMPTE Standard 304M complaint connectors (110 Series) in concert with our optical expertise to deliver the broadcast industry's most rugged fiber optic cable

assemblies. The assemblies are sealed to prevent penetration of solids or liquids.

AFSI offers its LimeLight cable assemblies in a variety of configurations. The assemblies are available in a plug/socket configuration or with SC, LC, FC, ST or expanded beam connectors. The fiber optic contacts are available in PC or Super PC polish.

Features & Benefits

- SMPTE 304M compliant connectors, 110 Series
- SMPTE 311M compliant cable
- Hybrid (2-ch single mode + 2HV + 2LV)
- Push-pull self-latching mechanism
- Low insertion loss
- Flexible cable construction
- Excellent back reflection with optional Super PC polish
- Plug to socket or 304M-to-SC, LC, FC, ST or expanded beam available
- Assemblies available on custom deployable reels
- Mating and demating is quick and effortless
- Low insertion loss supports long distances and concatenations



Example:

S PR PVC RC 0100 F

SMPTE Plug with Rubber Cover w/Dust Cap to Receptacle with Rubber Cover w/Dust Cap PVC 9.2 SMPTE Comp Cable 100 Ft.

Table A	
P	In Line Plug (110-1000-125)
R	In Line Receptacle (110-6500-125)
A	Fixed Rec Rear Square Flange (110-6100-125)
B	Fixed Rec Front Square Flange (110-6000-125)
C	Flanged Fixed Rec w/Strain Rel (110-6200-125)
D	Flanged Fixed Plug (110-2000-125)
E	Flanged Fixed Plug w/Strain Rel (110-2200-125)
F	LC
G	SC
H	ST
I	FC
J	None

Table B	
P	In Line Plug (110-1000-125)
R	In Line Receptacle (110-6500-125)
A	Fixed Rec Rear Square Flange (110-6100-125)
B	Fixed Rec Front Square Flange (110-6000-125)
C	Flanged Fixed Rec w/Strain Rel (110-6200-125)
D	Flanged Fixed Plug (110-2000-125)
E	Flanged Fixed Plug w/Strain Rel (110-2200-125)
F	LC
G	SC
H	ST
I	FC
J	None

Table D	
M	Metal Dust Cap
Z	No Dust Cap
R	Rubber Dust Cap Only
C	Rubber Cover & Cap

Table U	
F	Feet
M	Meters

Table A	
OPU	Outdoor Polyurethane (9.2 SMPTE 311 Comp)
TPE	Studio Grade TPE (9.2 SMPTE 311 Comp)
PLN	Plenum Rated (9.2 SMPTE Comp)
RIS	Riser Rated (9.2 SMPTE Comp)
12M	12.1mm
2MM	2.0mm Simplex
3MM	3.0mm Simplex
16M	1.6mm Simplex
CSO	Customer Supplied Outdoor Polyurethane
CST	Customer Supplied Studio Grade TPE
CSP	Customer Supplied Plenum
CSR	Customer Supplied Riser
CS1	Customer Supplied 12.1mm

110 Series - SMPTE 304M Accessories

SMPTE Rubber Protective Covers



110-J1000 In Line Plug Rubber Protective Cover



110-J6500 In Line Receptacle Rubber Protective Cover

SMPTE Dust Caps



110-SPP Panel Plug
Dust Cap



110-SSC Panel Receptacle
Dust Cap



110-DPP Panel Plug
Rubber Protective Cover



110-DSC Panel Receptacle
Rubber Protective Cover

SMPTE Field Termination Kits



The FKIT042 kit includes everything you need for field termination of SMPTE connectors including: wipes, cleaning solution, epoxy, syringe, tape, cable cutter, jacket stripper, safety glasses, curing block, kevlar shears, crimp tool, debris container, ruler, polishing puck, captivator/ extraction tool, pliers, crimp ring, scribe, pen, wire cutters, optic pad, temperature probe, carrying case and more. This kit is a must have for any broadcast field technician.

Discrete SMPTE Tools Termination Kits



110-TET	Terminus/Captivator Insertion & Extraction Tool
304-ETOOL-14	Elec Contact Extraction Tool 14 AWG
304-ETOOL-20	Elec Contact Extraction Tool 20 AWG
110-PP	Polishing Puck
110-HP	Plug Holding Pliers



Broadcast Cable Assemblies

AFSI is one of the world's leading manufacturers of harsh environment fiber optic connectors and cable assemblies for broadcast applications. AFSI's products are found everywhere from the HD camera, to the outside broadcast truck, to the production suite. Utilizing our quality AFSI connectors such as SMPTE 304M, TACBeam, TFOCA II®, FS3H (4-ch), FS12 Pierside (12-ch), 109 (2 & 4-ch), or any other connector your application requires. They are built to withstand the rigors of outdoor locations and extreme environments of broadcast.

Whether you're transmitting from a live sporting event, or covering a media event in severe weather, you can count on our cable assemblies because they are built in-house by our fiber experts in our ISO 9001:2000 certified facility in Allen, Texas. We can build to your specification or drawing, or assist in designing and building your custom cable assemblies. An optical test report is included with every completed cable assembly. If required, AFSI will conduct environmental testing. Our goal is to exceed customer requirements with every cable assembly.



TacBeam



FS12 Pierside



109 Series



FS3H Series



TFOCA-II®



110 Series



mTACb



109 Series - SMPTE358 Connectors



109 Series 4-Channel Hermaphroditic Plug

109 Series Connectors

Amphenol Fiber Systems International (AFSI) offers hermaphroditic fiber optic connectors for deployable fiber optic communication requirements. These rugged connectors are designed to be the industry's most economical connector providing easy maintenance and superior optical performance.

AFSI's line of 109 Series hermaphroditic connectors offers the ultimate in flexibility. 109 Series plugs can function as either a plug or a receptacle, allowing the assemblies to be easily daisy-chained to provide the required distance for any deployment condition.

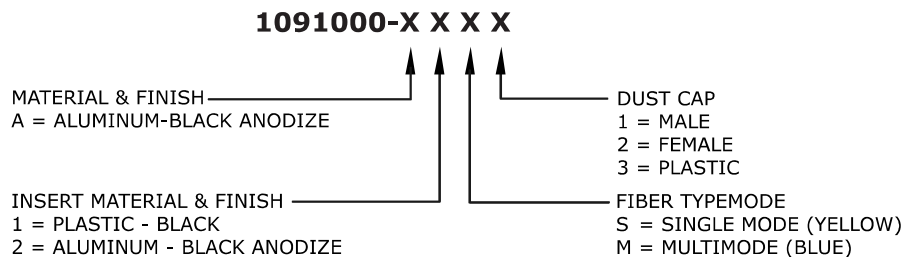
The 109 Series connector line meets or exceeds the pertinent requirements of Society of Motion Picture and Television Engineers (SMPTE) standard 358M on harsh environment multi channel fiber optic connectors suitable for deployment in demanding outdoor broadcast applications, including high definition television (HDTV) signal transmission.

Applications

- Deployable broadcast networks, including HDTV
- Outdoor fiber optic interconnect
- Emergency restoration systems
- Ship-to-shore communications
- Military tactical deployable systems

Features & Benefits

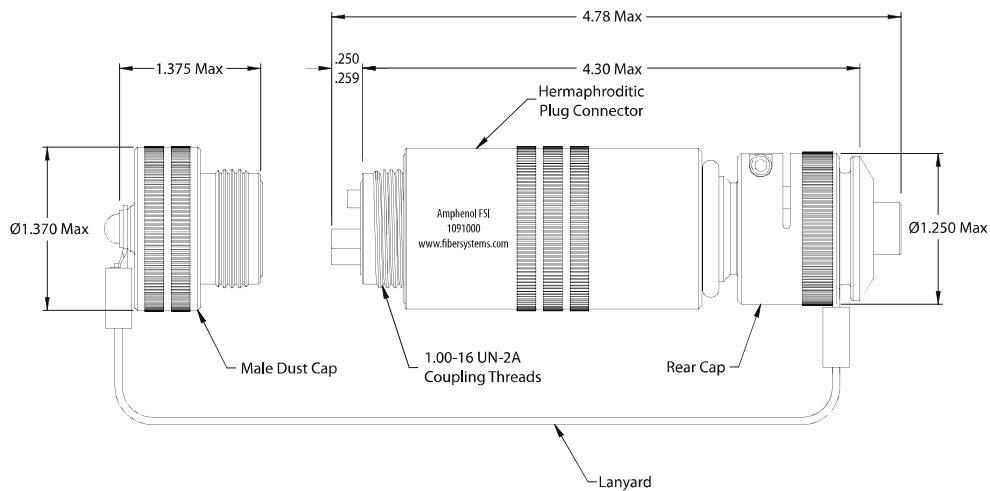
- 2- and 4-channel configurations
- Single mode and multimode compatible
- M29504/14 + /15 Termini
- Ultra PC polish option
- Assemblies available on reels
- Hermaphroditic design facilitates cable assembly daisy-chaining
- Industry tested M29504/14 + /15 Termini
- Single mode supports broadband requirements
- Verified intermateability with Delphi's TAC-4™



*Termini sold separately, see page 26

109 Series - SMPTE358 Connectors

1091000 4-Channel Plug



1091000-X X X X

MATERIAL & FINISH
A = ALUMINUM-BLACK ANODIZE

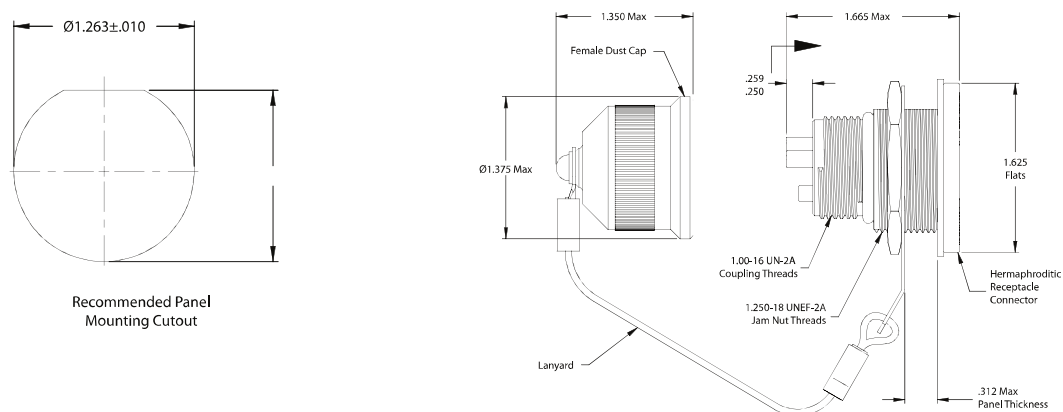
INSERT MATERIAL & FINISH
1 = PLASTIC - BLACK
2 = ALUMINUM - BLACK ANODIZE

DUST CAP
1 = MALE
2 = FEMALE
3 = PLASTIC

FIBER TYPE/MODE
S = SINGLE MODE (YELLOW)
M = MULTIMODE (BLUE)

*Termini sold separately, see page 26

1098080 4-Channel Receptacle



1098080-X X X X

MATERIAL & FINISH
A = ALUMINUM-BLACK ANODIZE

INSERT MATERIAL & FINISH
1 = PLASTIC - BLACK
2 = ALUMINUM - BLACK ANODIZE

DUST CAP
1 = MALE
2 = FEMALE
3 = PLASTIC

FIBER TYPE/MODE
S = SINGLE MODE (YELLOW)
M = MULTIMODE (BLUE)

*Termini sold separately, see page 26

FS12 Pierside Fiber Optic Connectors



FS12 Pierside Receptacle



FS12 Pierside Plugs on Hannay Reel



FS12 Pierside Plug Cable Assembly



FS12 Pierside Plug

FS12

Amphenol Fiber Systems International's (AFSI) FS12 fiber optic connector is for harsh environment, 12-channel broadcast applications. This connector is available in either single mode or multimode and uses field-proven MIL-PRF-29504 termini. This connector is ideal for high fiber-count tactical broadcast networks.

Removable termini, qualified to MIL-PRF-29504 specifications, enables quick connector reconfiguration and field maintainability.

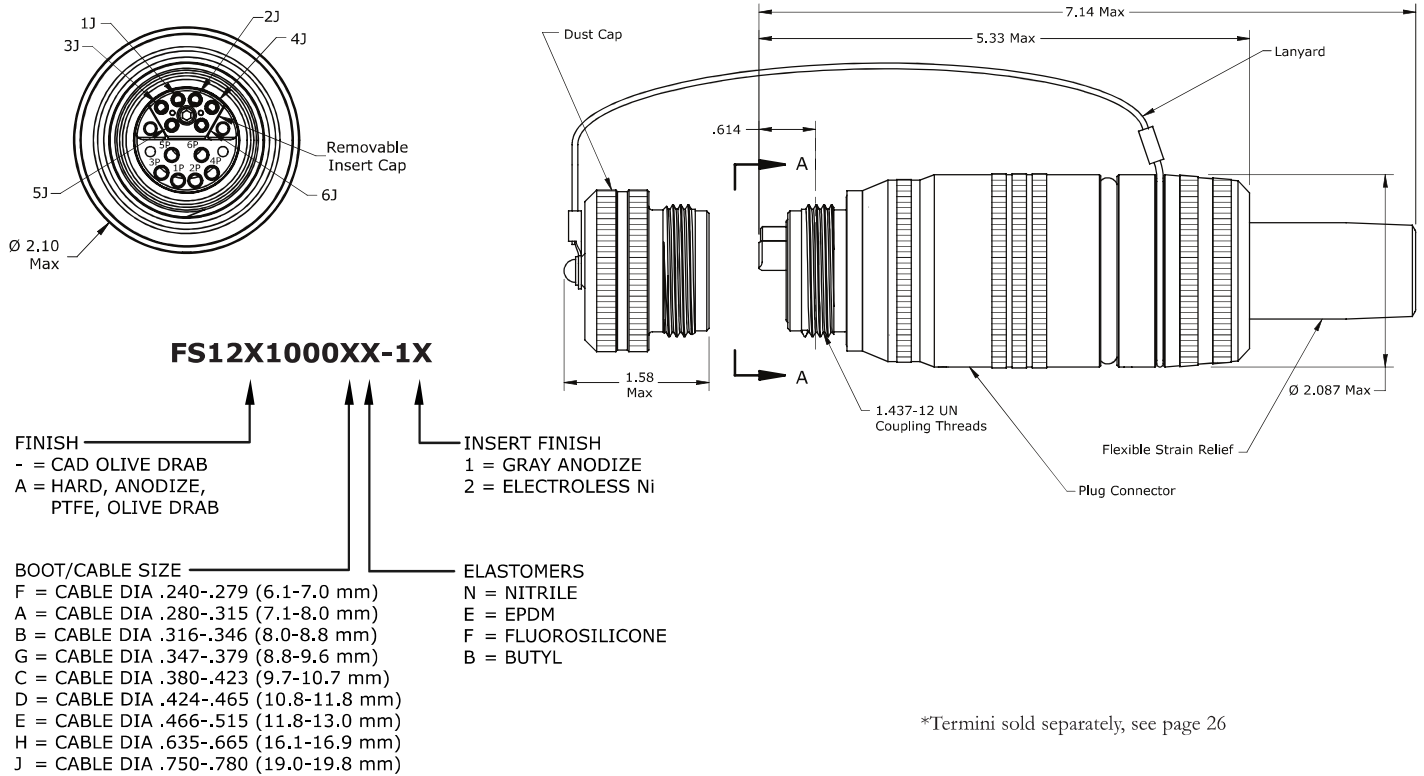


Features & Benefits

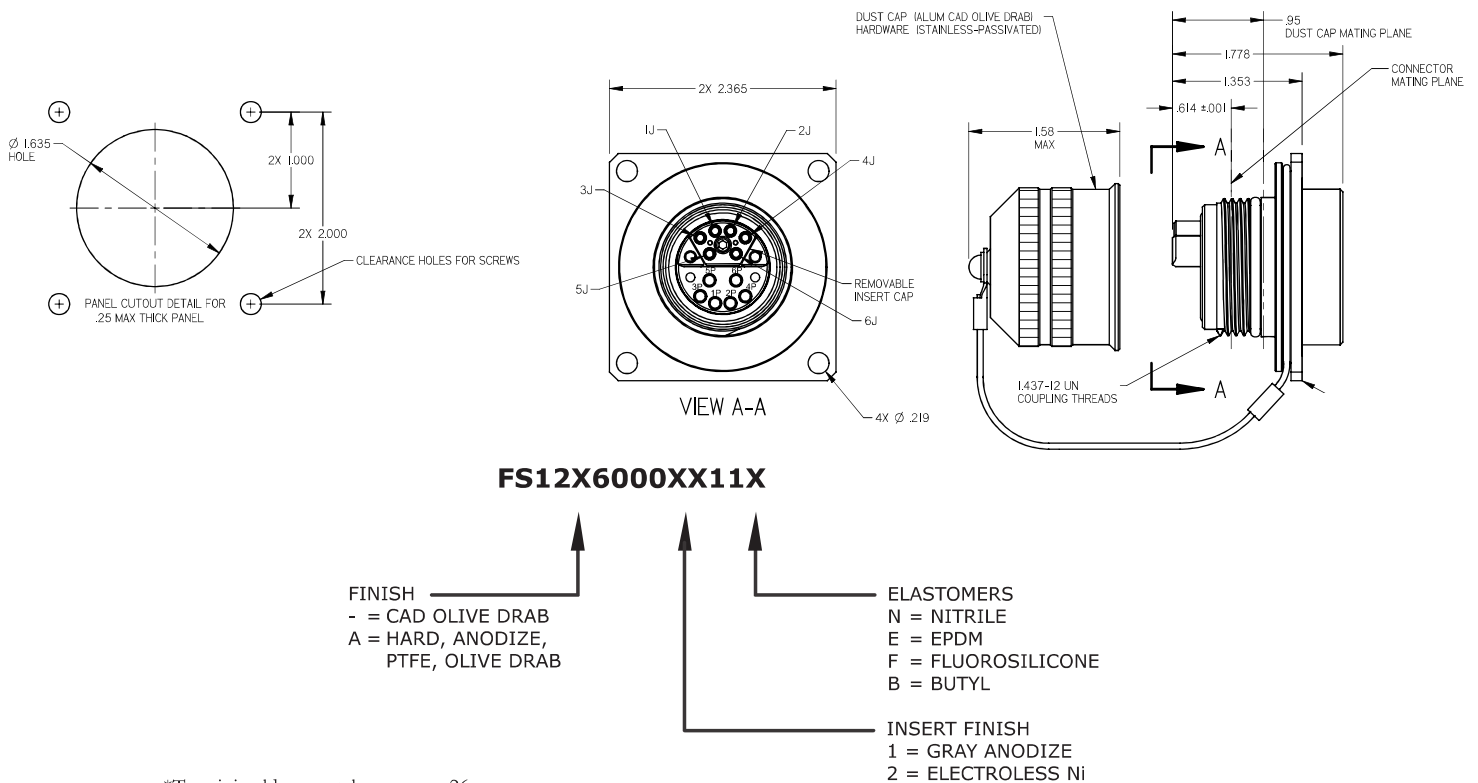
- Hermaphroditic Design: Enables plug-to-plug or plug-to-receptacle connectivity, facilitates cable assembly daisy-chaining
- Rugged Design: FS12 connector handles the rigors of deployment and harsh environment conditions for broadcast applications
- Environmentally Sealed Connector: Ensures environmental integrity
- Field proven MIL-PRF-29504 /14 & /15 Termini: Takes advantage of tightly toleranced commercial ceramic ferrules and alignment sleeves allowing either single mode or multimode use
- Removable Insert Cap: Enables ease of socket termini cleaning
- Captive Insert Cap Screw: Prevents loss of screw during cleaning or repair
- Sealed Termini: Keeps the optical path clear under extreme environmental conditions
- Verified intermateability with Delphi's TAC-12™

*Termini sold separately, see page 26

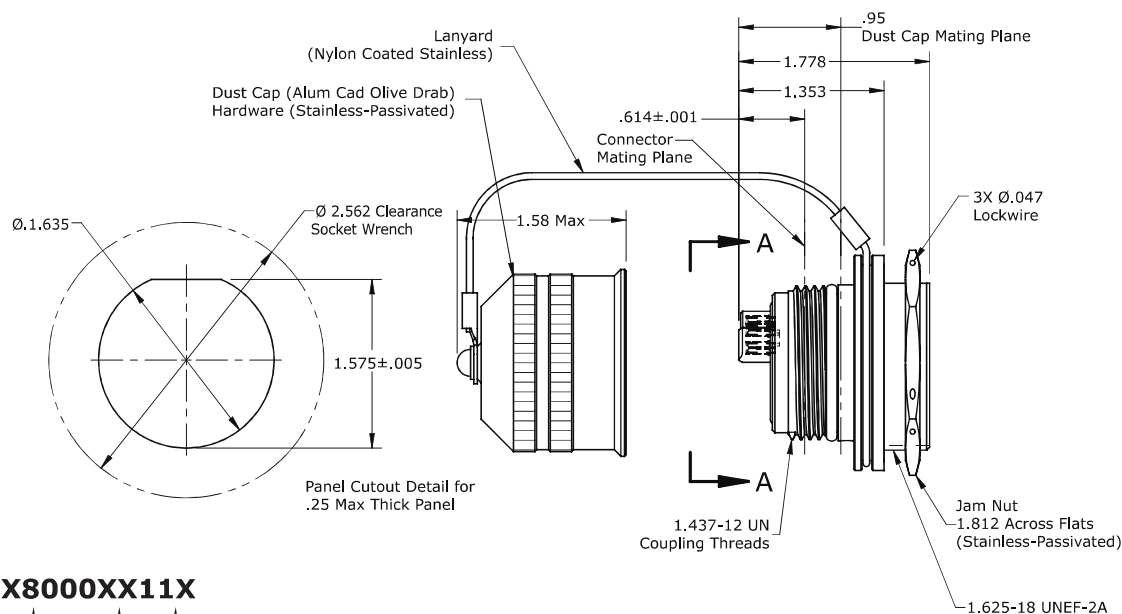
FS12-1000 12-Channel Plug



FS12-6000 12-Channel Receptacle Flanged



FS12-8000 12-Channel Receptacle Rear Jam Nut



FS12X8000XX11X

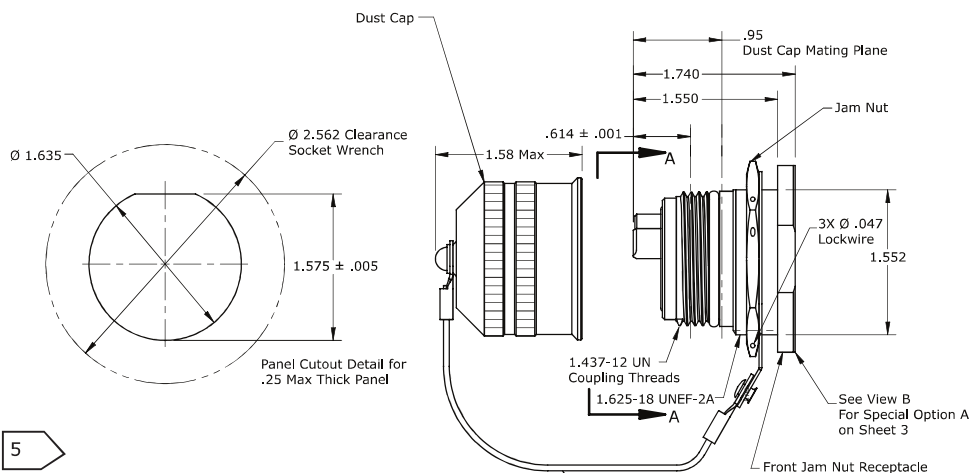
FINISH
- = CAD OLIVE DRAB
A = HARD, ANODIZE,
PTFE, OLIVE DRAB

ELASTOMERS
N = NITRILE
E = EPDM
F = FLUOROSILICONE
B = BUTYL

INSERT FINISH
1 = GRAY ANODIZE
2 = ELECTROLESS NI

*Termini sold separately, see page 26

FS12-8080 12-Channel Receptacle Front Jam Nut



FS12X8080XX11XX

5

4

FINISH
- = CAD OLIVE DRAB
A = HARD, ANODIZE,
PTFE, OLIVE DRAB

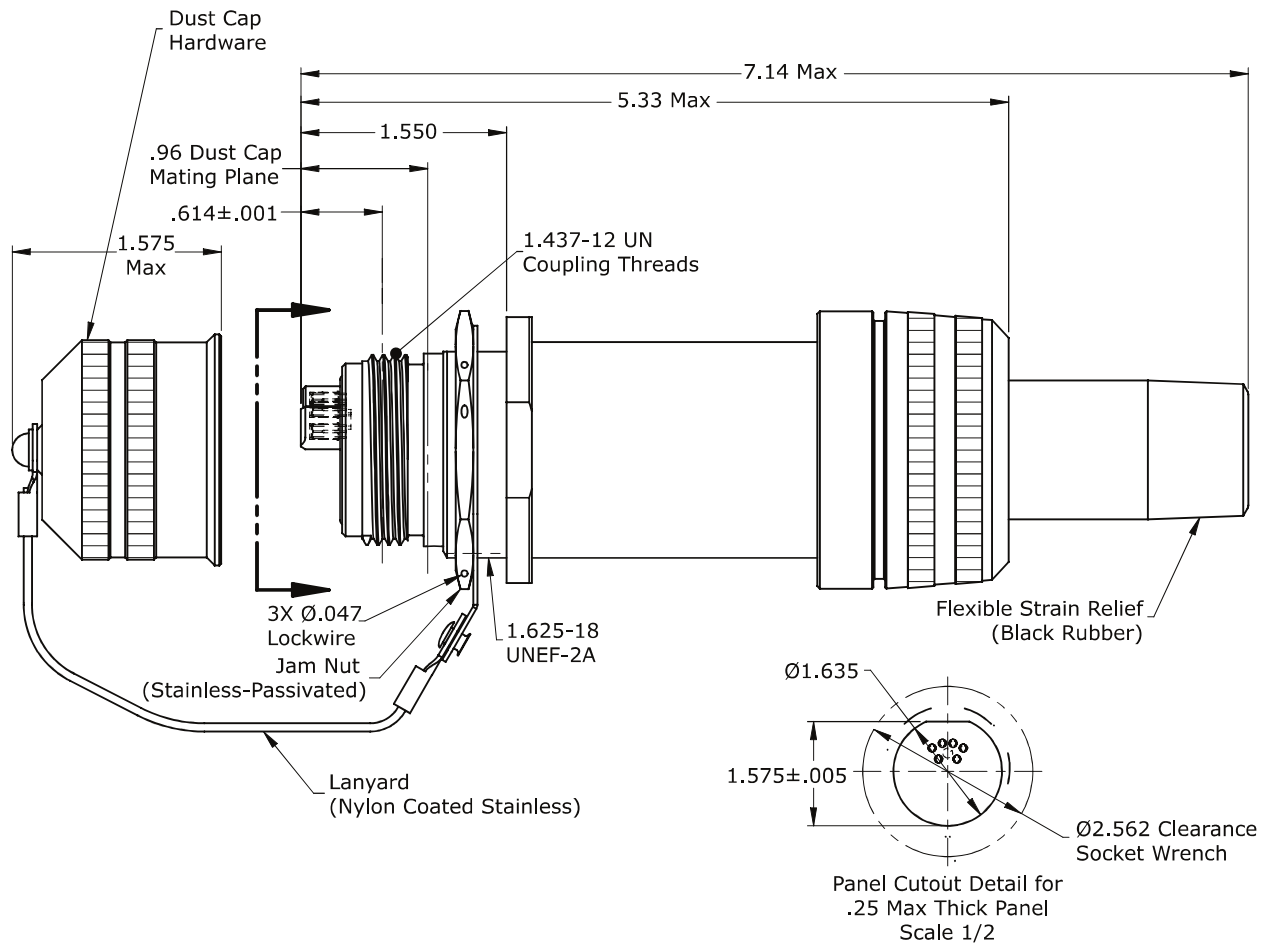
SPECIAL OPTIONS
BLANK = NO SPECIAL OPTIONS
A = NON-SEALED STRAIN RELIEF

INSERT FINISH
1 = GRAY ANODIZE
2 = ELECTROLESS NI

ELASTOMERS
N = NITRILE
E = EPDM
F = FLUOROSILICONE
B = BUTYL

*Termini sold separately, see page 26

FS12-8280 12-Channel Receptacle SRR



FS12X8280XX-11X

FINISH

- = CAD OLIVE DRAB
A = HARD ANODIZE, PTFE, LIGHT GREY
B = HARD ANODIZE, PTFE, BLACK

BOOT/CABLE SIZE

A = CABLE DIA .280-.315 (7.1-8.0 MM)
B = CABLE DIA .316-.346 (8.0-8.8 MM)
C = CABLE DIA .380-.423 (9.7-10.7 MM)
D = CABLE DIA .424-.465 (10.8-11.8 MM)
E = CABLE DIA .466-.515 (11.8-13.0 MM)
F = CABLE DIA .240-.279 (6.1-7.1 MM)
G = CABLE DIA .347-.379 (8.8-9.6 MM)
H = CABLE DIA .635-.665 (16.1-16.9 MM)
J = CABLE DIA .750-.780 (19.0-19.8 MM)

ELASTOMERS

N = NITRILE
E = EPDM
F = FLOUROSILICONE
B = BUTYL

INSERT FINISH

1 = GREY ANODIZE
2 = ELECTROLESS Ni



*Termini sold separately, see page 26

TFOCA-II® 4-Channel Fiber Optic Connectors



TFOCA-II® Receptacle

Cable Assembly w/TFOCA-II® Connectors

TFOCA-II®

Although originally conceived for use in military applications, the TFOCA-II® is widely used in the broadcast market. Because it was designed to handle harsh environments and constant handling and mating cycles common to tactical deployment, it is the perfect connector for the rigors of the broadcast world. If it can handle the battlefield, you know it will be dependable for the most extreme broadcast environments. Whether transmitting from an outdoor sporting event, or a media event in adverse weather conditions, the TFOCA-II® is a workhorse that can keep your fiber optic cable assemblies working reliably year after year.

Applications

- Audio/video links from camera to truck
- Audio links from mixing boards to amplifiers
- Satellite uplinks
- Audio links from source to production suite

*Termini sold separately, see page 26

Features & Benefits

- Hermaphroditic design for versatility - enables multiple TFOCA-II® plug assemblies to be concatenated
- Removable end cap - allows for easy field maintenance and cleaning
- Improved cable retention strength - designed to meet 400 lbs pull strength while protecting fibers from stress
- Commercial ceramic ferrule technology - enables TFOCA-II® connector to provision multimode and single mode interconnect with a variety of polishes including SPC and UPC
- Solid core alignment sleeves - more robust than split alignment sleeves
- Hermaphroditic dust cap - plug and/or receptacle dust caps connect together to prevent dust and moisture penetration during deployable conditions
- Optional key positions - four key positions (1, 2, 3 and universal) available, enabling segregation of mated plug/receptacles or plug/plug, through mechanical interface
- Field repairable using existing parts - additional connector components (other than termini) are not required to perform field repair

TACBeam Fiber Optic Connectors



The M83526/20 Compliant AFSI TACBeam Rugged Fiber Optic Connector



AFSI TACBeam Receptacle

TACBeam

Amphenol Fiber Systems International (AFSI) offers an expanded beam rugged fiber optic connector for broadcast applications. Expanded beam technology expands and collimates the optical signal through the connector interface path resulting in a diameter many times that of the original beam. The optical beam is then refocused into the core of the receiving fiber. The larger beam diameter improves insertion loss performance in the presence of dust and debris. Also, because the lenses do not physically contact, there is no wear on the termini allowing the connector to be mated and demated thousands of times without affecting optical performance.

The AFSI TACBeam is hermaphroditic, which facilitates the concatenation of multiple cable assemblies to support varying distance requirements. The connector is available in both single mode and multimode versions, can be configured

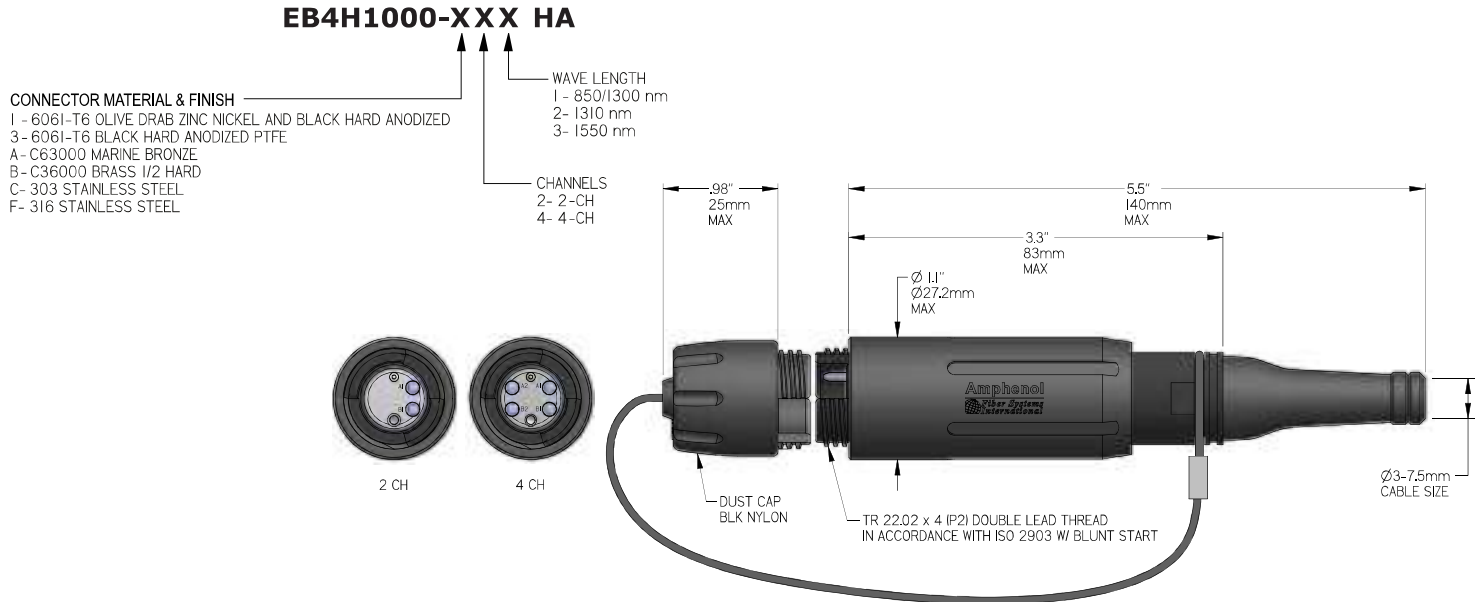
to support 1 to 4 fiber optic channels using a common insert and has been designed to accept a wide variety of cables to suit any broadcast.

Features & Benefits

- Supports both multimode and single mode fiber
- Expanded beam technology is less susceptible to dust and debris
- Monolithic insert design facilitates cleaning
- Hermaphroditic design enables daisy-chaining of cable assemblies to support varying distances
- Non-contacting interface allows thousands of mating cycles
- Captive insert cap screw: Prevents loss of screw during cleaning or repair
- Sealed termini: Keeps the optical path clear under extreme environmental conditions
- Field repairable using existing parts: Additional connector components (other than termini) are not required to perform field repair

TACBeam Configurations

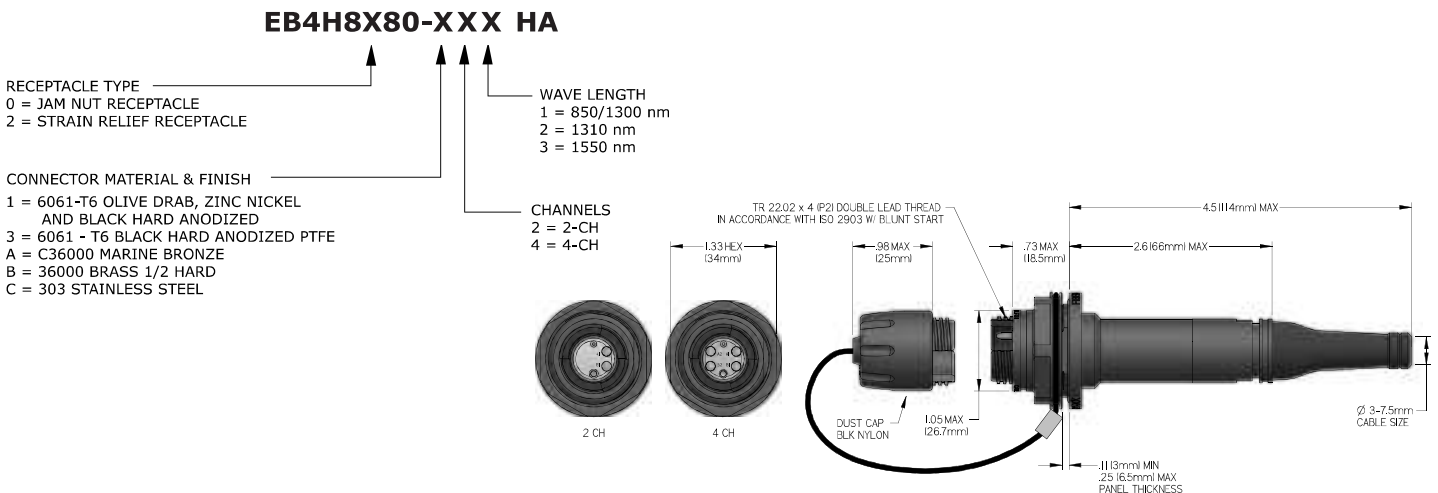
EB4H1000 Plug Assembly



EB4H8000 Receptacle Assembly



EB4H8280 Strain Relief Receptacle



Specifications

Specification	Measurement/Detail
Insertion Loss, Typical	0.7 dB, multimode, @ 1310nm, 0.7 dB, single mode, @ 1310nm or 1550nm
Return Loss	≥-34.0 dB unmated @ 1310nm or 1550nm
Mating Durability	3,000 cycles
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 85°C
Cyclic Temperature	-55°C/85°C
Humidity	95% RH
Immersion	15m, water (plug & receptacle)
Drop Test	500 falls on concrete, 1.2m
Impact/Shock	EIA/TIA 455-2, Method C, service class: Severe
Vibration	EIA/TIA 455-11, sinusoidal condition III (at 10g), random condition VI (letter C) for 1.5 hours
Weight	Plug approx. 150g, Receptacle approx. 100g

EB4H6000 Flange Mount Receptacle

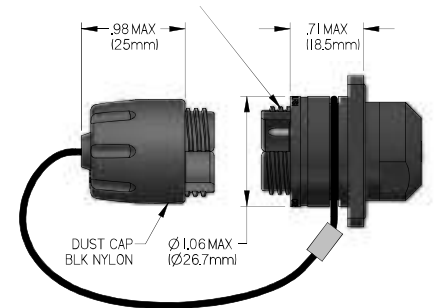
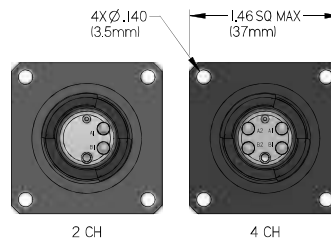
EB4H6X00-XXXX

RECEPTACLE TYPE
 0 = FLANGE MOUNT RECEPTACLE
 2 = FLANGE MOUNT STRAIN RELIEF RECEPTACLE

CONNECTOR MATERIAL & FINISH
 1 = 6061-T6 OLIVE DRAB, ZINC NICKEL AND BLACK HARD ANODIZED
 3 = 6061 - T6 BLACK HARD ANODIZED PTFE
 A = C36000 MARINE BRONZE
 B = 36000 BRASS 1/2 HARD
 C = 303 STAINLESS STEEL

WAVE LENGTH
 1 = 850/1300 nm
 2 = 1310 nm
 3 = 1550 nm

CHANNELS
 2 = 2-CH
 4 = 4-CH



EB4H6200 Flange Mount Receptacle

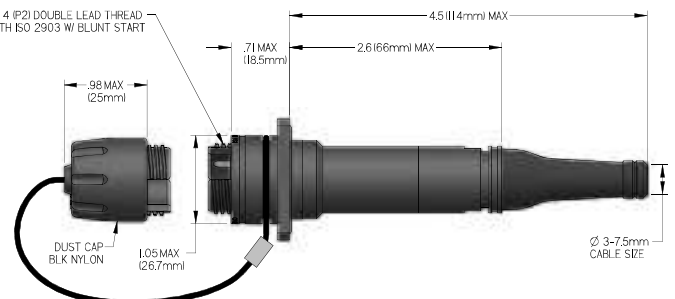
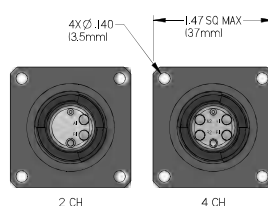
EB4H6X00-XXXX

RECEPTACLE TYPE
 0 = FLANGE MOUNT RECEPTACLE
 2 = FLANGE MOUNT STRAIN RELIEF RECEPTACLE

CONNECTOR MATERIAL & FINISH
 1 = 6061-T6 OLIVE DRAB, ZINC NICKEL AND BLACK HARD ANODIZED
 3 = 6061 - T6 BLACK HARD ANODIZED PTFE
 A = C36000 MARINE BRONZE
 B = 36000 BRASS 1/2 HARD
 C = 303 STAINLESS STEEL

WAVE LENGTH
 1 = 850/1300 nm
 2 = 1310 nm
 3 = 1550 nm

CHANNELS
 2 = 2-CH
 4 = 4-CH



mTACH Fiber Optic Connectors



mTACH, Miniature 2-Channel Fiber Optic Connector

mTACH

Amphenol Fiber Systems International (AFSI) offers a high-performance, dual-channel her-maphroditic fiber optic connector, ideally suited for the energy, broadcast, and military markets. The mTACH connector is rugged yet compact. It is designed for use in tight spaces yet durable enough for use in applications requiring multiple mating cycles and harsh environments.

The connector design utilizes a simple termination procedure allowing users to terminate the connectors on site. The simple tools required for assembly and maintenance are available from AFSI, and test equipment is also available. AFSI offers training on the termination procedure at our facility in Allen, Texas, or at the customer's location.

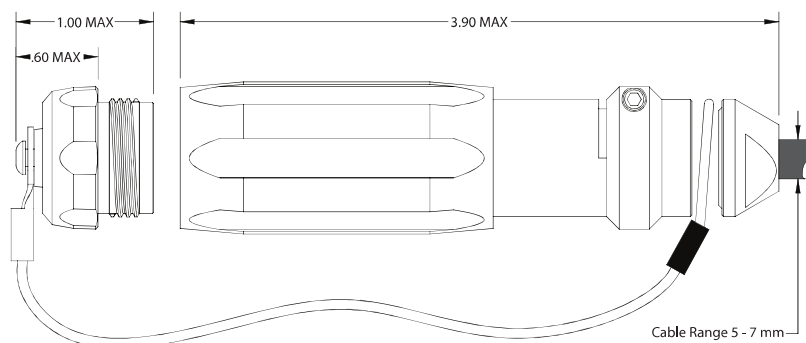
Features & Benefits

- Easy concatenation
- Single mode and multimode versions
- Compact size
- Multiple finishes and materials available
- RoHS compliant
- Environmentally sealed
- 2000 mating cycles durability
- Insertion loss (SM or MM): -0.75dB max



mTACH Fiber Optic Connectors

mTACH1000 Plug Assembly



mTACH1000 X A1 X

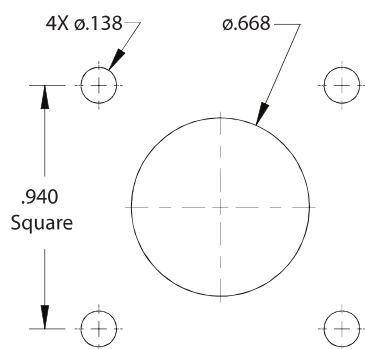
Connector Material & Finish

3 = 6061-T6 ALUM, GLOSS BLACK HARD ANODIZED PTFE
7 = 6061-T6 ALUM, NATURAL HARD ANODIZED PTFE
C = 303 STAINLESS, PASSIVATED

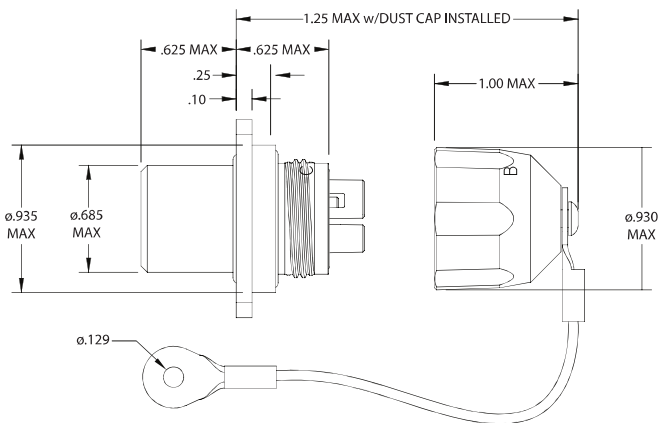
Dust Cap

- 1 HERMAPHRODITIC, SAME MATERIAL/FINISH AS CONNECTOR
- 2 HERMAPHRODITIC, BLACK PLASTIC
- 3 MALE, SAME MATERIAL/FINISH AS CONNECTOR
- 4 MALE, BLACK PLASTIC

mTACH6000 Flange Mount Receptacle



Panel Cutout



mTACH6000 X A1 X

CONNECTOR MATERIAL & FINISH

3 = 6061-T6 ALUM, GLOSS BLACK HARD ANODIZED PTFE
7 = 6061-T6 ALUM, NATURAL HARD ANODIZED PTFE
C = 303 STAINLESS, PASSIVATED

DUST CAP

- 1 FEMALE, SAME MATERIAL/FINISH AS CONNECTOR
- 2 FEMALE, BLACK PLASTIC

110 Series - SMPTE 304M Termini

110 Series Termini is a line of cost-effective fiber optic termini for use in connectors conforming to the SMPTE 304M Standard. These termini are designed to be used in the AFSI 110 Series connectors as well as replacement termini for comparable LEMO® SMPTE 304M compatible connectors.



110-TP-125	SMPTE 304M Pin Termini High Performance 125.5
110-TS-125	SMPTE 304M Socket Termini High Performance 125.5

M29504/14 & /15 Termini

M29504/14 & /15 termini are used in AFSI's 4-channel (109 Series) and 12-channel (FS12) standard hermaphroditic connectors and are qualified to MIL-PRF-29504B specifications. These contacts can also be used to replace the fiber optic termini in Delphi's TAC-4® and TAC-12® connectors.

M29504/14-XXXX Pin Termini				M29504/15-XXXX Socket Termini				Max Fiber Dia Microns
MM	SM	MM (short)	SM (short)	MM	SM	MM (short)	SM (short)	
4131	4141	4151	4161	4171	4181	4191	4201	126
4135	4145	4155	4165	4175	4185	4195	4205	142



MTFP Series Termini

The MTFP Series termini are used in AFSI's TFOCA-II® connectors and feature an innovative double-floating seal design that allows maximum terminus travel with minimum side forces transferred to the terminus. This design ensures maximum optical isolation and terminus sealing under the harshest conditions.



MTFP1000	MTFP Multimode Termini
MTFP1100	MTFP Single Mode Termini
MTFP1150	MTFP Multimode Sleeve
MTFP1175	MTFP Single Mode Sleeve

MTACT Series Termini

The MTACT series termini are specifically designed for use in AFSI's mTACH connectors. AFSI's mTACH is a high performance, dual channel, hermaphroditic fiber optic connector that is ideally suited for the broadcast market. It is designed for use in tight spaces, yet durable enough for applications requiring multiple mating cycles and harsh environments.

MTACT1000	mTACH Termini (Single Mode or Multimode)
MTACT2000	mTACH Termini w/ Alignment Sleeve (Single Mode or Multimode)
MTACT3000	mTACH Dummy Termini



Amphenol Reel Enhanced System (ARES)



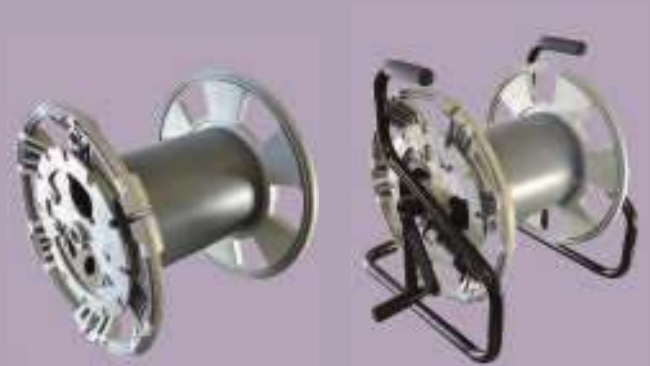
AFSI Fiber Optic Reels

About Fiber Optic Reels

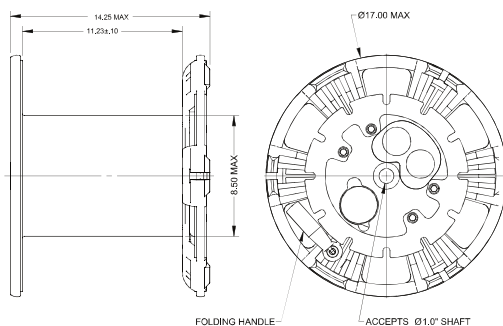
Amphenol Fiber Systems International (AFSI) offers the rugged, deployable ARES (Amphenol Reel Enhanced System) reel for tactical broadcast fiber optic network applications. The unit is made with reinforced glass nylon providing a rust-resistant, lightweight and durable reel for storing and deploying fiber optic cable assemblies. Integrated slots on the reel allow them to be stacked for storage and transit. The ARES reel also has separate payout and storage areas allowing the operator to deploy what cable is needed rather than the entire stored length. AFSI's ARES reel comes in a variety of sizes to support multiple cable lengths and types. In addition, cleaning kits can be specified to support all popular harsh environment connectors including AFSI's TFOCA, TFOCA-II®, TFOCA-III®, TACBeam, 109 and FS12 Pierside. Finally, AFSI offers a suite of transit cases and backpacks as optional accessories.

Features & Benefits

- Integrated fiber optic cleaning kit allows connector maintenance during deployment
- Separate payout and storage areas allows the user to deploy what they need instead of the entire payload
- Retractable crank, internal connector storage spaces and interlocking slots allow ARES to be easily stacked, stored and transported
- Rust-resistant, lightweight construction
- Reel frame, transit case and manpack options available



ARES Reel Specifications



Product Number Identification

ARES-XXXX-X-X

CAPACITY
0100 = 100M
0300 = 300M
0500 = 500M
1000 = 1000M

COLOR
G = GREY
D = DESERT SAND

ACCESSORIES
ARES F5 = REEL FRAME WITH 500M CAPACITY
ARES R1 = REEL STAND WITH 100M CAPACITY

CLEANING KIT
1 = TFOCA II®
2 = TFOCA III®
3 = TFOCA
4 = PIERSIDE
5 = TACBEAM



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Fax: 214.547.9344
www.fibersystems.com
sales@fibersystems.com

Publication: AFSI-Broadcast Cat-Final-xx.xx.12 Specifications subject to change without notice.

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TFOCA-II® & GoldRush® are covered by U.S. Patents 6,305,849, 6,371,660 and 6,357,929