Fiber Optic Solutions for Military Ground Systems

WIT 위트솔루션즈
Wise Industrial Technology

(주)위트솔루션즈
서울시 송파구 송파대로 167 문정역테라타워 A동 404호
Tel:02-2054-8688 E-mail:sales@witsolutions.co.kr
Website:www.witsolutions.co.kr

Amphenol
Fiber Systems International

Contents

All defense application photographs are courtesy of the U.S. Army, redstone.army.mil, mda.mil & defenselink.mil.

Amphenol Fiber Systems International (AFSI) is one of the leading providers of rugged fiber optic interconnect and optical system technologies for the military. AFSI's connectors and cable assemblies, designed to withstand the harshest modern battlefield conditions, have been a standard in the military for over a decade.

AFSI's development and patent of the TFOCA-II® connector puts it on the leading edge of technology, providing a more reliable tactical connector than previously available.

Industries Served

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

- Tactical deployed communications
- Shipboard communication and navigation
- Ship-to-Shore (Pierside) communications
- Oil & gas
- Mining
- Network disaster recovery
- Deployable seismic systems
- Optical sensing
- Marine and land-based geoseismic
- Broadcast
- Aeronautical and airframe

Products

AFSI provides a wide range of products including:

- Fiber optic connectors and assemblies
- Fiber optic termini
- Optical switching systems
- Electrical-to-Optical-to-Electrical (E-O-E) solutions
- System design services
- Ancillary products such as training, termination kits, test equipment and assembly tools

Cable Assemblies

AFSI is one of the world's leading manufacturers of harsh environment fiber optic connectors. Our products are rugged, reliable and cost-effective. Virtually every major defense company in the United States, the U.S. Army, the U.S. Navy and many international defense organizations are among our valued customers.

AFSI cable assemblies are manufactured by expert technicians in our state-of-the-art, ISO 9001:2000 and AS9100 certified facility (see below). This ensures that our processes and practices are optimized for the unique requirements of fiber optic cable assemblies, rather than one-size-fits-all electrical assemblies.

AFSI technicians, skilled in procedures critical to manufacturing harsh environment fiber optic cable assemblies, can assist in designing and building custom assemblies or building to a customer print. An optical test report is included with every completed cable assembly. If required, AFSI will conduct environmental testing. With every cable assembly, our goal is to exceed customer requirements.

TFOCA-II®

In 1999, AFSI designed the "next generation" deployable fiber optic connector for the emerging "knowledge-centric warfare communication" requirements of the future battlefield. With this new product, a tactical, deployable fiber optic connector, the TFOCA-II® family of connectors was born, becoming an enabling technology for the digital battlefield.

The heart of the TFOCA-II® family of deployable fiber optic connectors centers on the TFOCA-II® sealed free-floating termini. The robust termini design enables TFOCA-II® connectors to seal against high humidity and moisture conditions while allowing full axial and orbital movement of the mated termini, providing low insertion loss and minimal back reflection.

Features & Benefits

- Hermaphroditic design for versatility
- Removable insert cap
- 4 & 12-channel connector designs
- Improved cable retention strength
- Zinc alloy plating
- Commercial ceramic ferrule technology
- Solid core alignment sleeves
- Hermaphroditic dust cap
- Optional key configurations
- Field repairable using existing parts
- Multiple materials & finishes available

AFSI designed its patented TFOCA-II® connectors to survive the harshest battlefield conditions imaginable. As a result, the U.S. ARMY WIN-T program selected TFOCA-II® as the standard "next generation" fiber optic connector for military tactical deployable networks.

TFOCA-II® 4-Ch Specifications

Parameter	Typical	Maximum
Insertion Loss (multimode) Per Mated Pair/Connection	0.30dB	0.75dB
Insertion Loss (single mode) Per Mated Pair/Connection	0.40dB	0.75dB
Back Reflection/Return Loss (SM-UPC polish)	-50dB	-40dB

Specification	Measurement/Detail
Operating Temperature	-46°C to +71°C
Storage Temperature	-55°C to +85°C
Mud	5 minute immersion, clean with water (per MIL-PRF-83526 requirements)
Water Immersion	EIA-455-40, Water, 1m, 48hr
Ice Crush	DOD-STD-1678, Method 4050
Humidity	EIA/TIA-455-5
Flammability	MIL-STD-1344, Method 1012
Vibration (operational)	EIA/TIA-455-11
Shock	EIA/TIA-455-14, Condition A
Mating Durability	2,000 cycles per EIA/TIA-455-21
Cable Seal Flexing	100 cycles per EIA/TIA-455-1
Twist	1,000 cycles per EIA/TIA-455-36
Cable Retention	400 pounds minimum per EIA/TIA-455-6, 1hr (applies to plug and strain relief receptacles); 800 pounds typical
Impact	EIA/TIA-455-2, Method B
Crush Resistance	450 pounds minimum per EIA/TIA-455-26
EMI Shielding Effectiveness (receptacle only)	>60dB per IEEE-299, 15KHz to 10GHz
Corrosion Resistance	EIA/TIA-455-16

TFOCA-II® 4-Ch Ordering (Plugs)

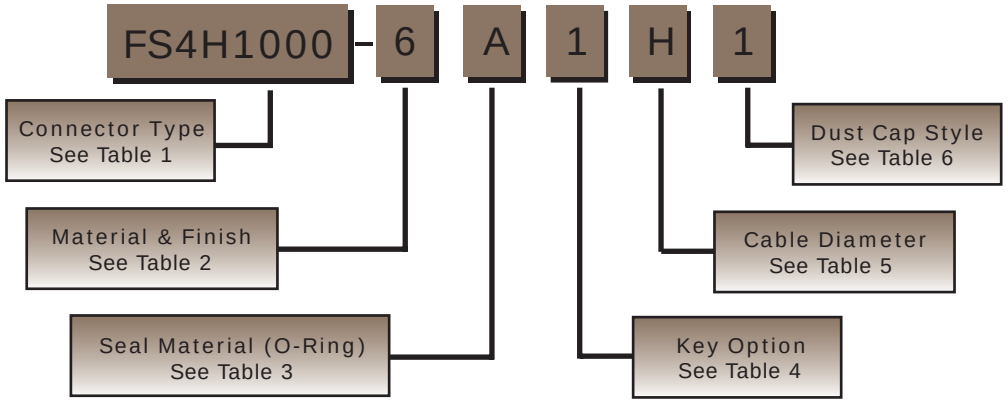


Table 1	
Connector Type	Part Number
TFOCA-II® Plug	FS4H1000
TFOCA-II® 90° Plug	FS4H1090

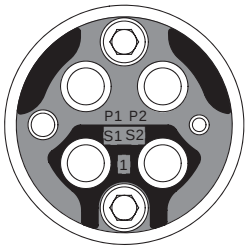
Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile	A

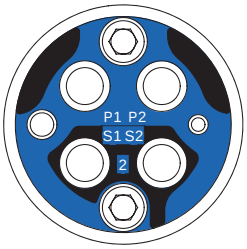
Table 4	
Key Option	Dash Number
Key 1, Grey	1
Key 2, Blue	2
Key 3, Red	3
Key U, Green	4

Table 5	
Cable Diameter inch (mm)	Dash Number
0.150-0.190 (3.81-4.83)	P
0.190-0.239 (4.83-6.07)	H
0.240-0.279 (6.10-7.09)	F
0.270-0.290 (6.86-7.37)	N
0.280-0.315 (7.11-8.00)	A
0.316-0.346 (8.03-8.79)	B
0.347-0.379 (8.81-9.63)	G
0.380-0.423 (9.65-10.74)	C
0.424-0.465 (10.77-11.81)	D

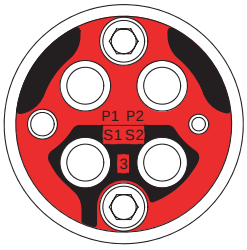
Table 6	
Dust Cap Style	Dash Number
Hermaphroditic, 4-Ch	1



STANDARD KEY
(Option 1)



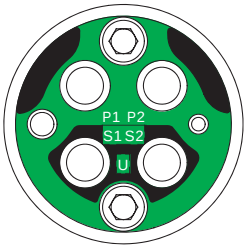
KEY OPTION 2



KEY OPTION 3

Example Part Number - FS4H1000-6A1H1

FS4H1000 - TFOCA-II® Plug
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
A - Nitrile
1 - Key 1, Grey
H - 0.190-0.239 (4.83-6.07)
1 - Dust Cap Assy, Hermaphroditic



UNIVERSAL KEY
(Option 4)

Additional configurations available. Contact factory representative for details.

TFOCA-II® 4-Ch Ordering (Receptacles)

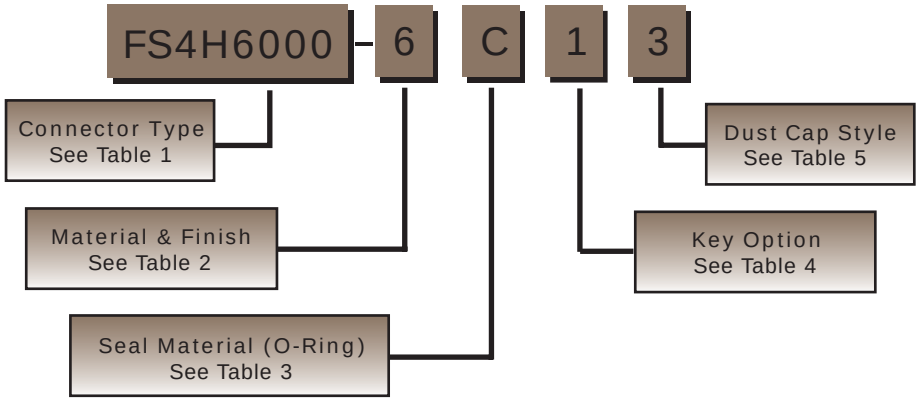


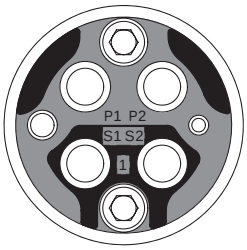
Table 1	
Connector Type	Part Number
TFOCA-II® Flange Mount Receptacle, External Mount	FS4H6000
TFOCA-II® Flange Mount Receptacle, Internal Mount	FS4H6080
TFOCA-II® Jam Nut Receptacle, External Mount	FS4H8000
TFOCA-II® Jam Nut Receptacle, Internal Mount	FS4H8080

Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

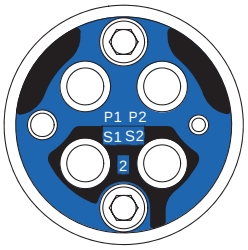
Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile and Fluorosilicone	C

Table 4	
Key Option	Dash Number
Key 1, Grey	1
Key 2, Blue	2
Key 3, Red	3
Key U, Green	4

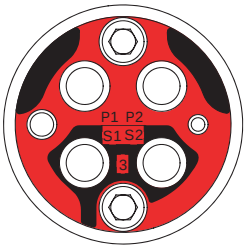
Table 5	
Dust Cap Style	Dash Number
Female, 4-Ch	3



STANDARD KEY
(Option 1)



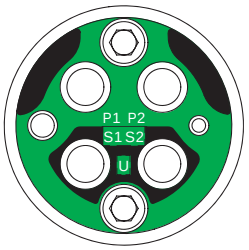
KEY OPTION 2



KEY OPTION 3

Example Part Number - FS4H6000-6C13

FS4H6000 - TFOCA-II® External Flange Mount Receptacle
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
C - Nitrile and Fluorosilicone
1 - Key 1, Grey
3 - Dust Cap Assy, Female



UNIVERSAL KEY
(Option 4)

Additional configurations available. Contact factory representative for details.

TFOCA-II® 4-Ch Ordering (SRR Receptacles*)

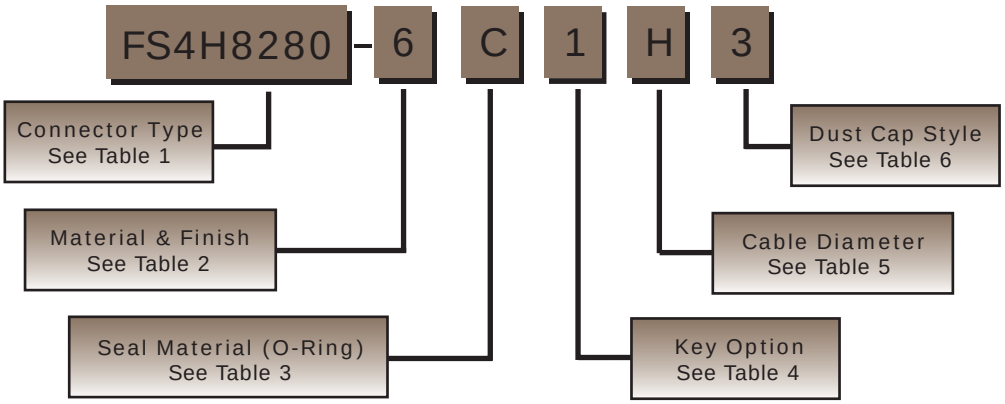


Table 1	
Connector Type	Part Number
TFOCA-II® Flange Mount Strain Relief Receptacle, External Mount	FS4H6200
TFOCA-II® Jam Nut Strain Relief Receptacle, Internal Mount	FS4H8280

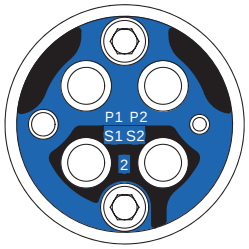
Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile and Fluorosilicone	C

Table 4	
Key Option	Dash Number
Key 1, Grey	1
Key 2, Blue	2
Key 3, Red	3
Key U, Green	4

Table 5	
Cable Diameter inch (mm)	Dash Number
0.150-0.190 (3.81-4.83)	P
0.190-0.239 (4.83-6.07)	H
0.240-0.279 (6.10-7.09)	F
0.270-0.290 (6.86-7.37)	N
0.280-0.315 (7.11-8.00)	A
0.316-0.346 (8.03-8.79)	B
0.347-0.379 (8.81-9.63)	G
0.380-0.423 (9.65-10.74)	C
0.424-0.465 (10.77-11.81)	D

Table 6	
Dust Cap Style	Dash Number
Female, 4-Ch	3



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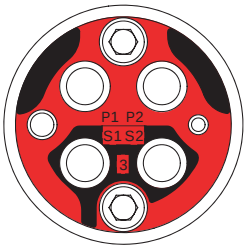
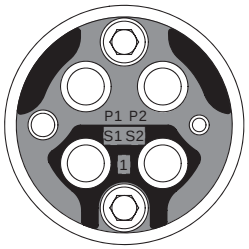
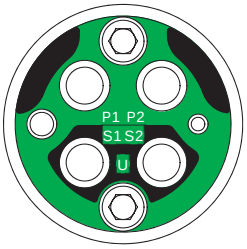


KEY OPTION 3



STANDARD KEY (Option 1)



UNIVERSAL KEY (Option 4)

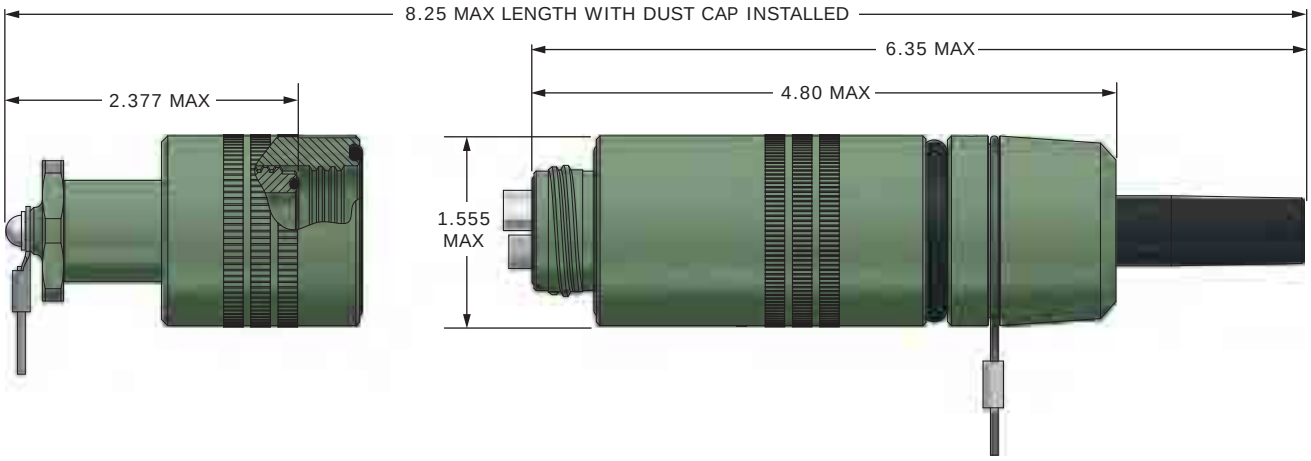
Example Part Number - FS4H8280-6C1H3

FS4H8280 - TFOCA-II® Jam Nut Strain Relief Receptacle (SRR)
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
C - Nitrile and Fluorosilicone
1 - Key 1, Grey
H - 0.190-0.239 (4.83-6.07)
3 - Dust Cap Assy, Female

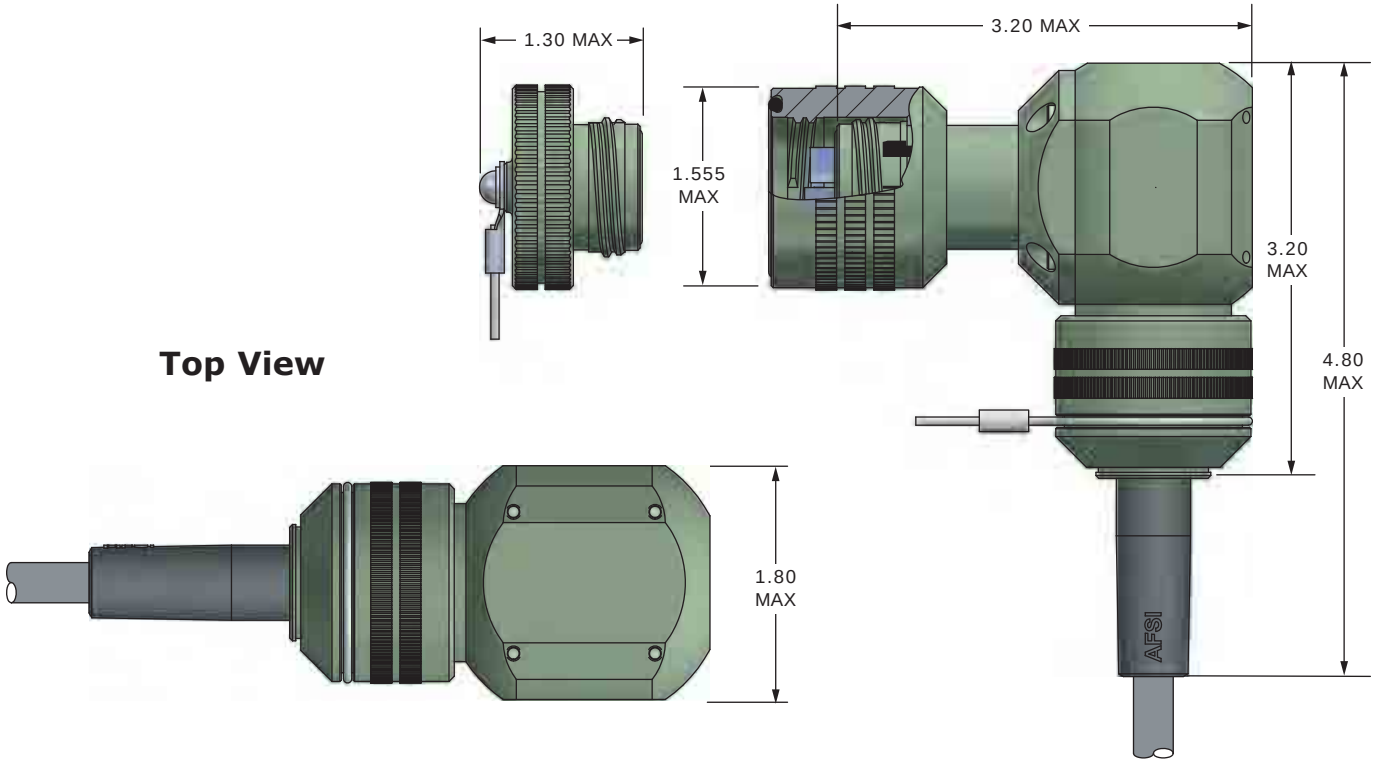
*** Receptacle w/ Integrated Strain Relief**

Additional configurations available. Contact factory representative for details.

FS4H1000
TFOCA-II® Plug

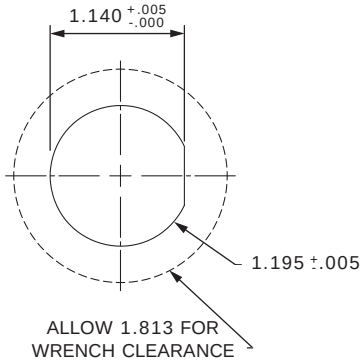


FS4H1090
TFOCA-II® 90° Plug

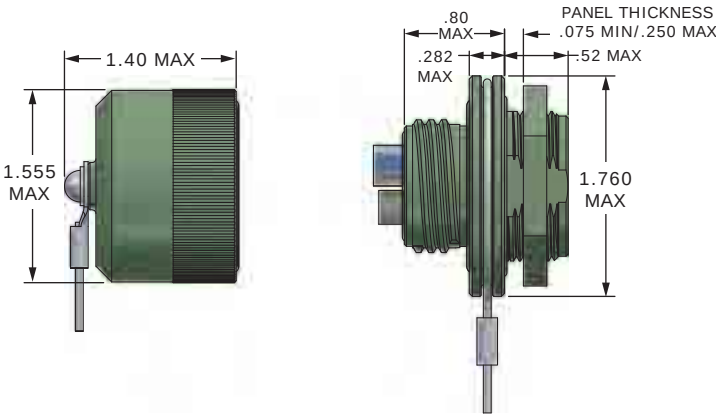


Dimensions are for reference only. Dimensions are in inches.

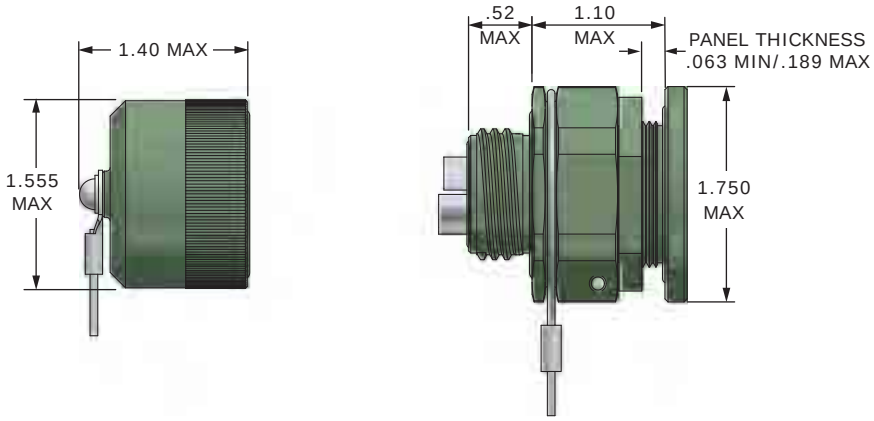
Panel Cut-Out
(Dimensions are the same for FS4H8000, FS4H8080 & FS4H8280)



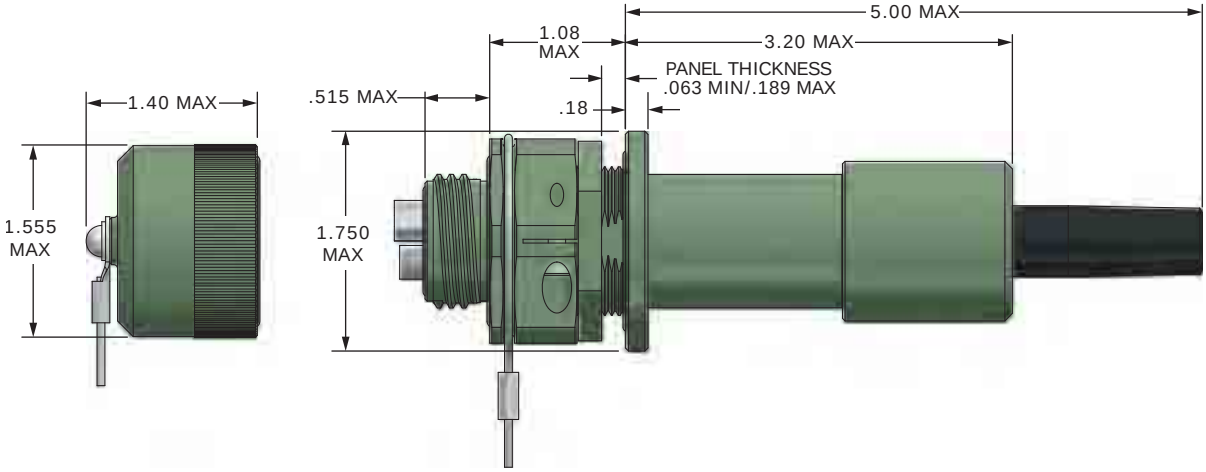
FS4H8000
TFOCA-II® Jam Nut Receptacle
(External Mount)



FS4H8080
TFOCA-II® Jam Nut Receptacle
(Internal Mount)



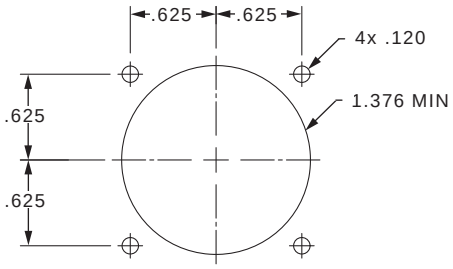
FS4H8280
TFOCA-II® Jam Nut Strain Relief Receptacle (SRR)
(Internal Mount)



Dimensions are for reference only. Dimensions are in inches.

TFOCA-II® 4-Ch Flange Receptacles

FS4H6000
TFOCA-II® Flange Mount Receptacle
(External Mount)



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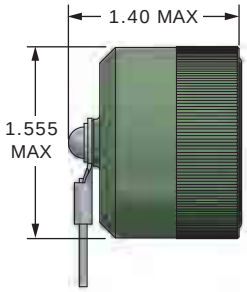
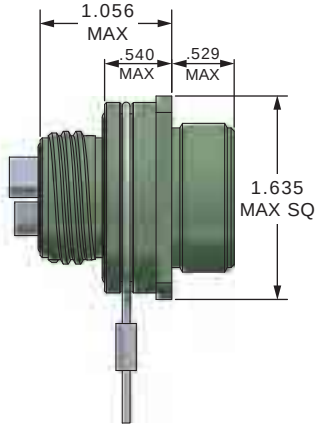
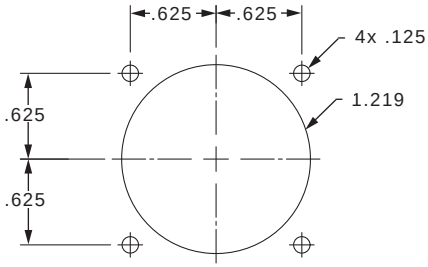




FS4H6080
TFOCA-II® Flange Mount Receptacle
(Internal Mount)



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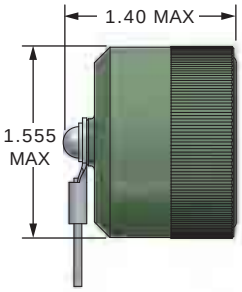
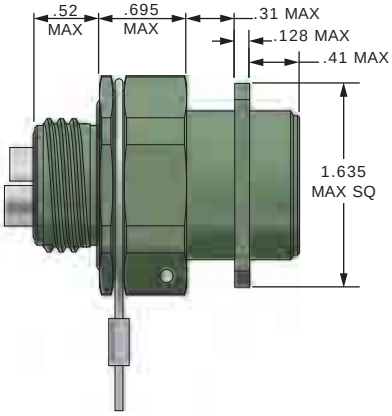
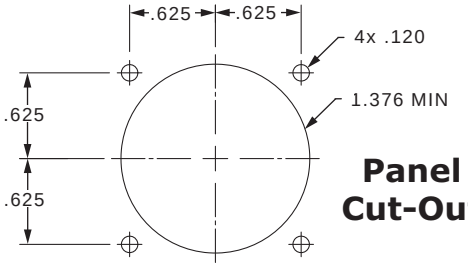
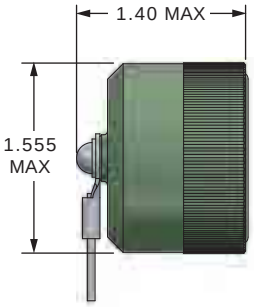


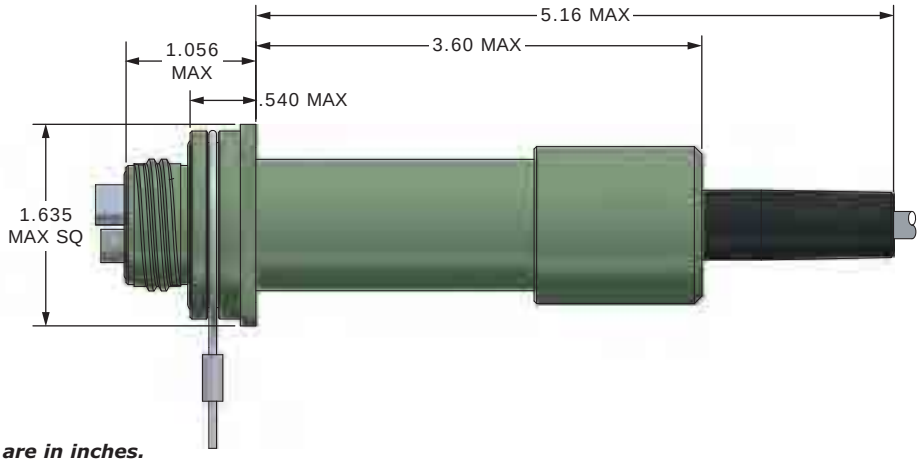




Panel Cut-Out

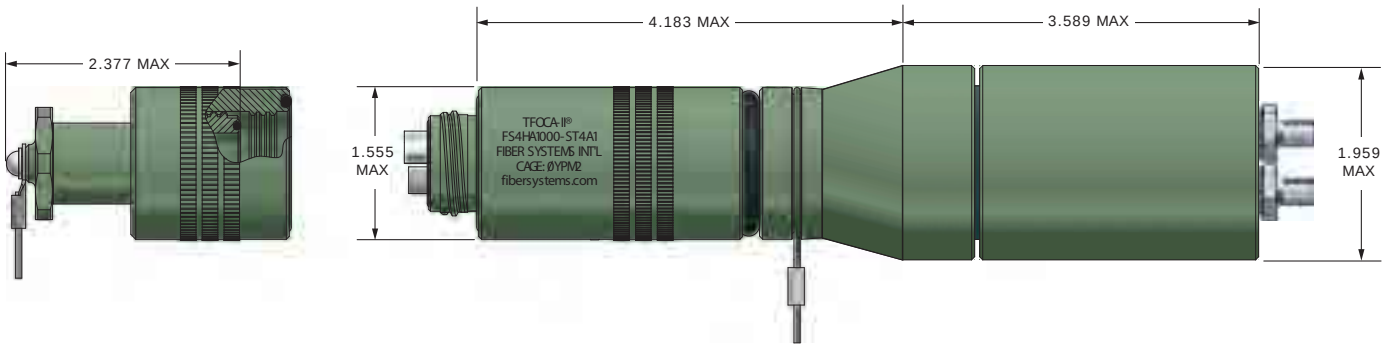


FS4H6200
TFOCA-II® Flange Mount Strain Relief Receptacle (SRR)
(External Mount)

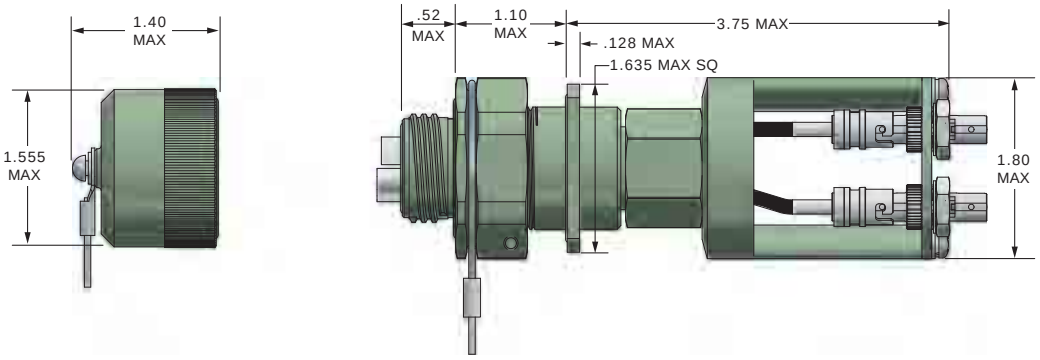


Dimensions are for reference only. Dimensions are in inches.

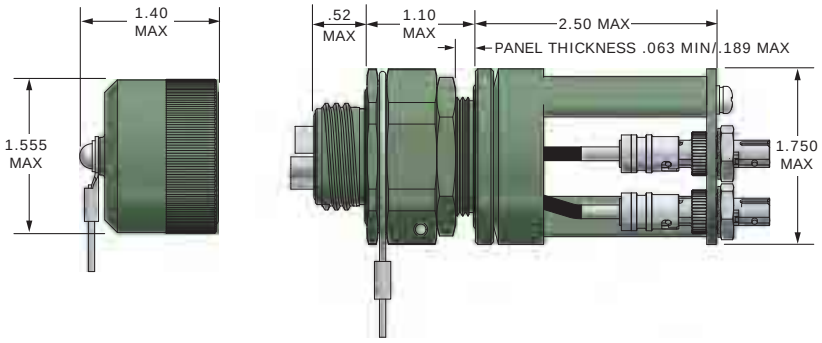
TFOCA-II® 4-Ch Plug with Integrated Patch Panel (IPP)



TFOCA-II® 4-Ch Flange Mount Receptacle with Integrated Patch Panel (IPP)



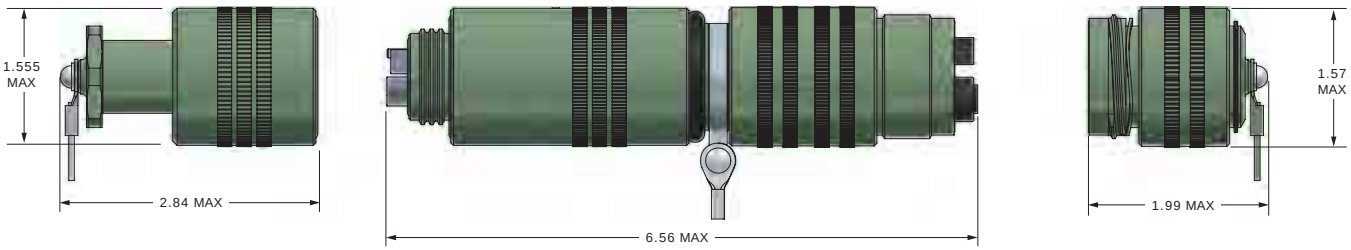
TFOCA-II® 4-Ch Jam Nut Receptacle with Integrated Patch Panel (IPP)



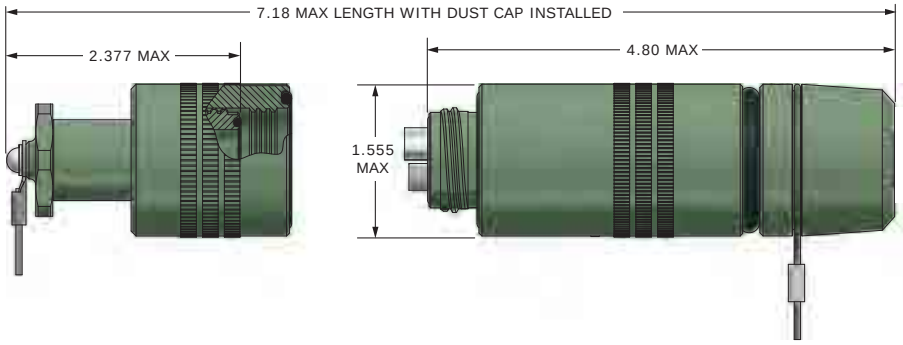
Dimensions are for reference only. Dimensions are in inches.

Specialty Connectors

TFOCA-to-TFOCA-II® Adapter



TFOCA-II® Loopback Plug



Dimensions are for reference only. Dimensions are in inches.

TFOCA-II® 12-Ch Specifications

Parameter	Typical	Maximum
Insertion Loss (multimode) Per Mated Pair/Connection	0.30dB	0.75dB
Insertion Loss (single mode) Per Mated Pair/Connection	0.40dB	0.75dB
Back Reflection/Return Loss (SM-UPC polish)	-50dB	-40dB

Specification	Measurement/Detail
Operating Temperature	-46°C to +71°C
Storage Temperature	-55°C to +85°C
Mud	5 minute immersion, clean with water (per MIL-PRF-83526 requirements)
Water Immersion	EIA-455-40, Water, 1m, 48hr
Ice Crush	DOD-STD-1678, Method 4050
Humidity	EIA/TIA-455-5
Flammability	MIL-STD-1344, Method 1012
Vibration (operational)	EIA/TIA-455-11
Shock	EIA/TIA-455-14, Condition A
Mating Durability	2,000 cycles per EIA/TIA-455-21
Cable Seal Flexing	100 cycles per EIA/TIA-455-1
Twist	1,000 cycles per EIA/TIA-455-36
Cable Retention	400 pounds minimum per EIA/TIA-455-6, 1hr (applies to plug and strain relief receptacles); 800 pounds typical
Impact	EIA/TIA-455-2, Method B
Crush Resistance	450 pounds minimum per EIA/TIA-455-26
EMI Shielding Effectiveness (receptacle only)	>60dB per IEEE-299, 15KHz to 10GHz

TFOCA-II® 12-Ch Ordering (Plug)

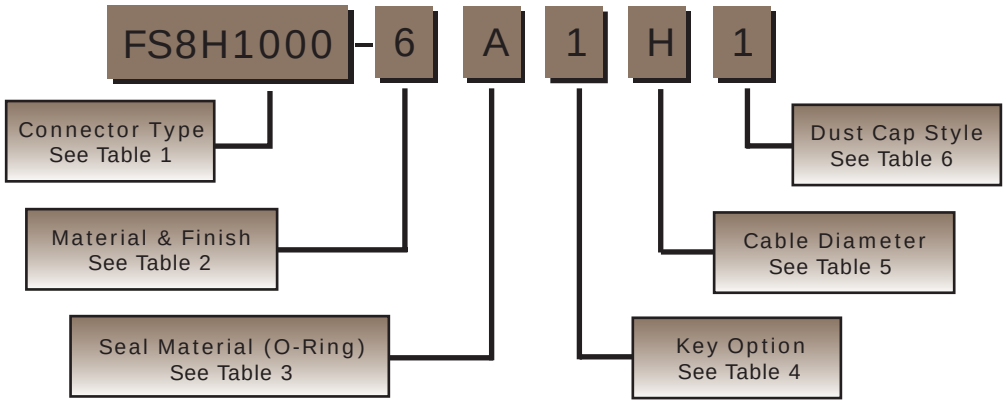


Table 1	
Connector Type	Part Number
TFOCA-II® Plug	FS8H1000

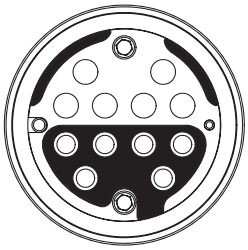
Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile	A

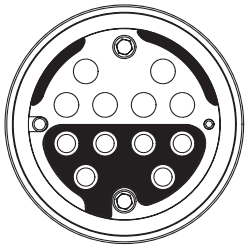
Table 4	
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5	
Cable Diameter inch (mm)	Dash Number
.240-.279 (6.1-7.1)	F
.280-.315 (7.1-8.0)	A
.316-.346 (8.0-8.8)	B
.347-.379 (8.8-9.6)	G
.380-.423 (9.7-10.7)	C
.424-.465 (10.8-11.8)	D
.466-.515 (11.8-13.0)	E
.516-.555 (13.1-14.1)	R
.600-.635 (15.2-16.1)	K
.635-.665 (16.1-16.9)	H
.669-.701 (17.0-17.8)	N
.705-.736 (17.9-18.7)	P
.750-.775 (19.0-19.8)	J
.776-.805 (19.7-20.4)	M

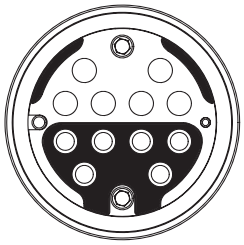
Table 6	
Dust Cap Style	Dash Number
Hermaphroditic, 12-Ch	1



KEY OPTION 2



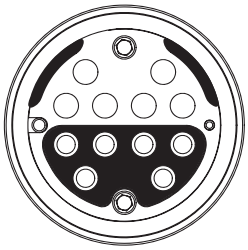
KEY OPTION 3



STANDARD KEY
(Option 1)

Example Part Number - FS8H1000-6A1H1

FS8H1000 - TFOCA-II® Plug
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
A - Nitrile
1 - Key 1
H - .635-.665 (16.1-16.9)
1 - Dust Cap Assy, Hermaphroditic



UNIVERSAL KEY
(Option 4)

Additional configurations available. Contact factory representative for details.

TFOCA-II® 12-Ch Ordering (Receptacles)

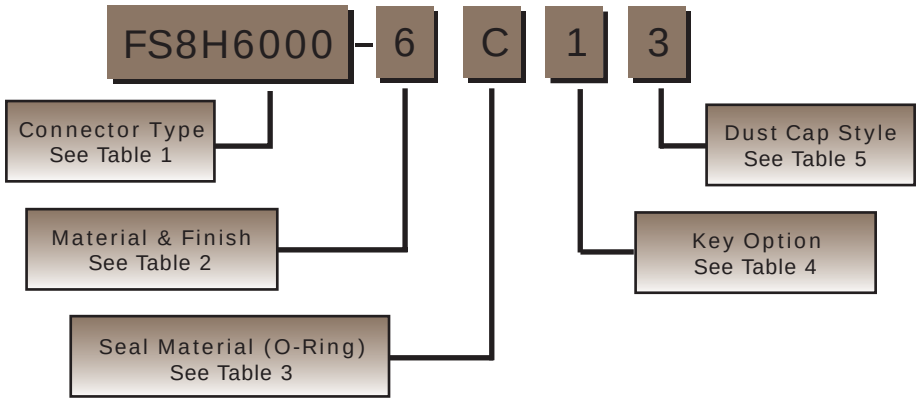


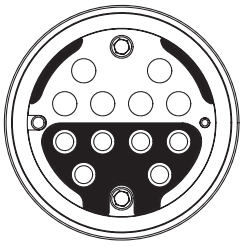
Table 1	
Connector Type	Part Number
TFOCA-II® Flange Mount Receptacle, External Mount	FS8H6000
TFOCA-II® Jam Nut Receptacle, External Mount	FS8H8000
TFOCA-II® Jam Nut Receptacle, Internal Mount	FS8H8080

Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

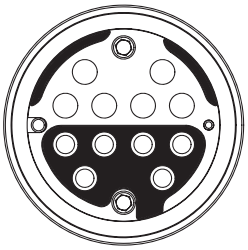
Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile and Fluorosilicone	C

Table 4	
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5	
Dust Cap Style	Dash Number
Female, 12-Ch	3



STANDARD KEY
(Option 1)



KEY OPTION 2

Example Part Number - FS8H6000-6C13

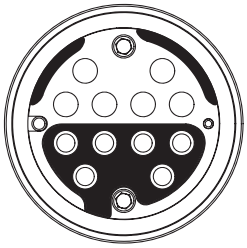
FS8H6000 - TFOCA-II® External Flange Mount Receptacle

6 - 6061-T6 Al ALY Zn-ALLOY Color OD

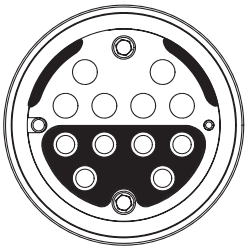
C - Nitrile and Fluorosilicone

1 - Key 1

3 - Dust Cap Assy, Female



KEY OPTION 3



UNIVERSAL KEY
(Option 4)

Additional configurations available. Contact factory representative for details.

TFOCA-II® 12-Ch Ordering (SRR Receptacles*)

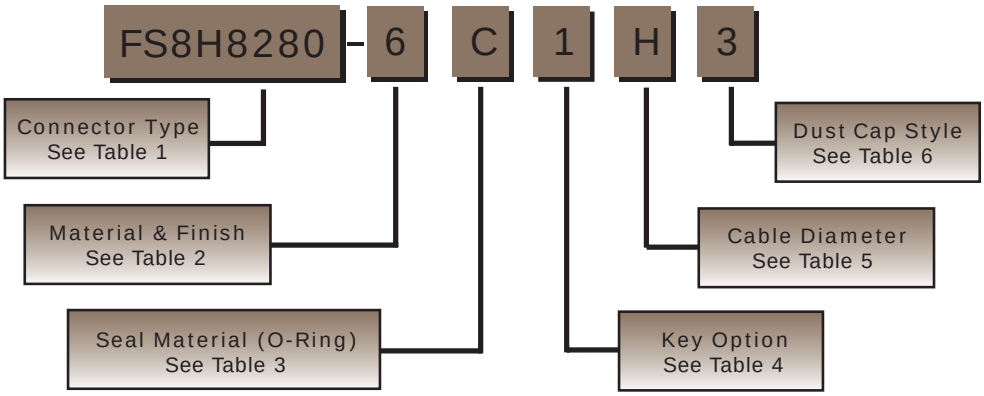


Table 1	
Connector Type	Part Number
TFOCA-II® Flange Mount Strain Relief Receptacle, External Mount	FS8H6200
TFOCA-II® Jam Nut Strain Relief Receptacle, Internal Mount	FS8H8280

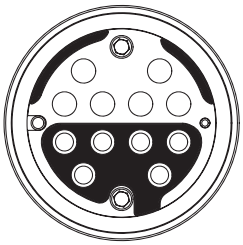
Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile and Fluorosilicone	C

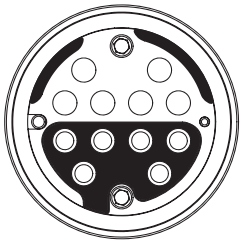
Table 4	
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5	
Cable Diameter inch (mm)	Dash Number
.240-.279 (6.1-7.1)	F
.280-.315 (7.1-8.0)	A
.316-.346 (8.0-8.8)	B
.347-.379 (8.8-9.6)	G
.380-.423 (9.7-10.7)	C
.424-.465 (10.8-11.8)	D
.466-.515 (11.8-13.0)	E
.516-.555 (13.1-14.1)	R
.600-.635 (15.2-16.1)	K
.635-.665 (16.1-16.9)	H
.669-.701 (17.0-17.8)	N
.705-.736 (17.9-18.7)	P
.750-.775 (19.0-19.8)	J
.776-.805 (19.7-20.4)	M

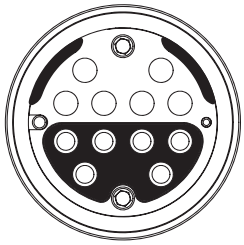
Table 6	
Dust Cap Style	Dash Number
Female, 12-Ch	3



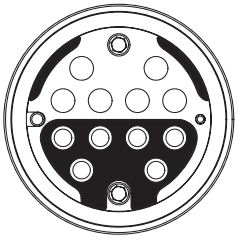
KEY OPTION 2



KEY OPTION 3



UNIVERSAL KEY (Option 4)



STANDARD KEY (Option 1)

Example Part Number - FS8H8280-6C1H3

FS8H8280 - TFOCA-II® Jam Nut Strain Relief Receptacle (SRR)

6 - 6061-T6 Al ALY Zn-ALLOY Color OD

C - Nitrile and Fluorosilicone

1 - Key 1

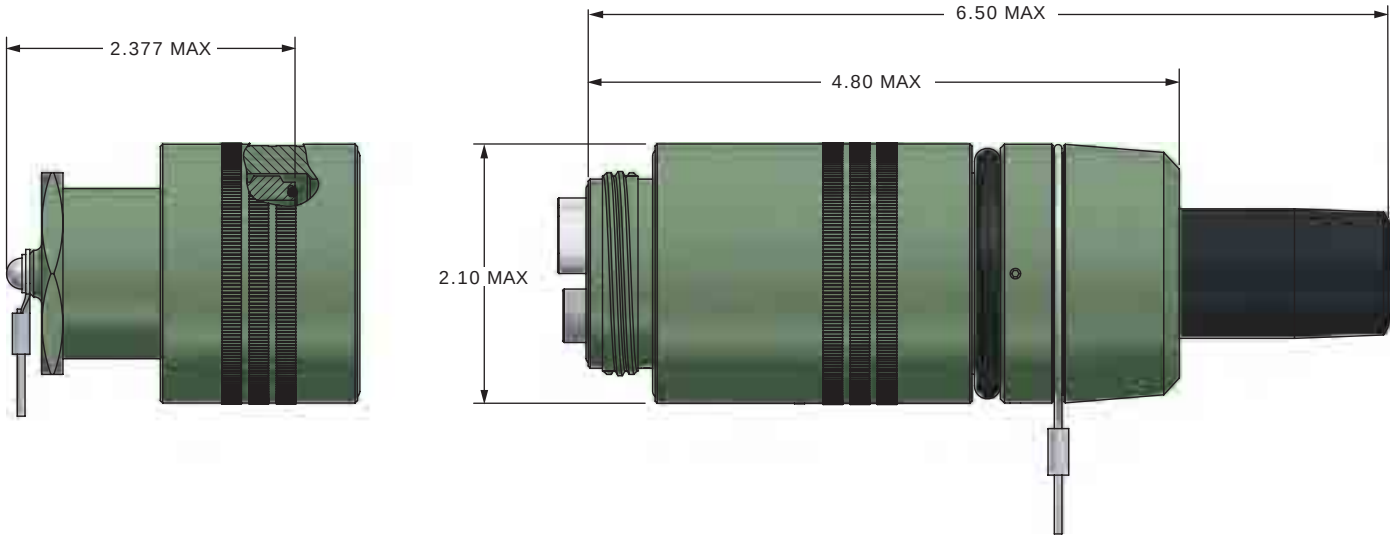
H - .635-.665 (16.1-16.9)

3 - Dust Cap Assy, Female

*** Receptacle w/ Integrated Strain Relief**

Additional configurations available. Contact factory representative for details.

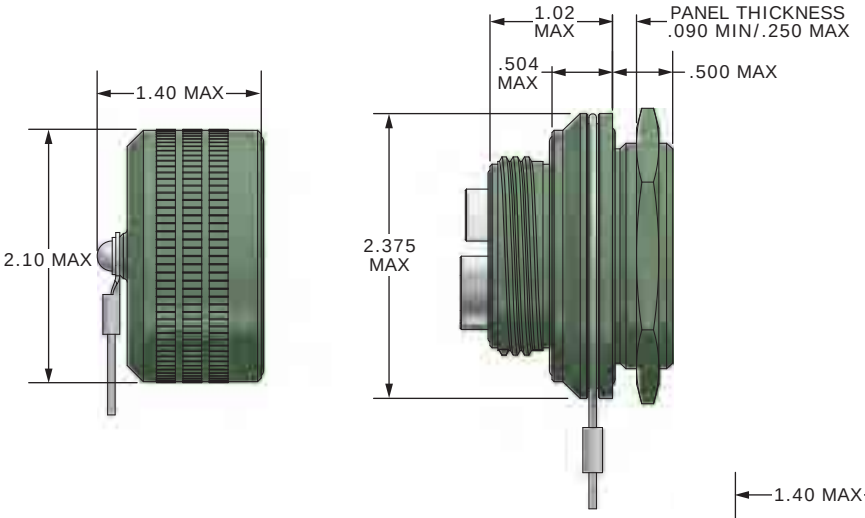
FS8H1000
TFOCA-II® Plug



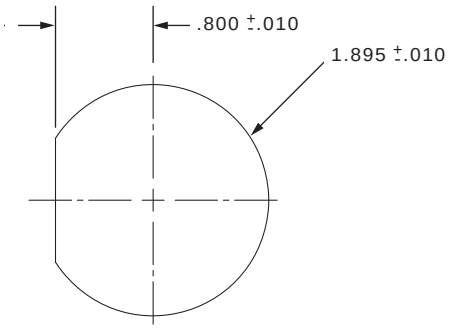
Dimensions are for reference only. Dimensions are in inches.

TFOCA-II® 12-Ch Jam Nut Receptacles

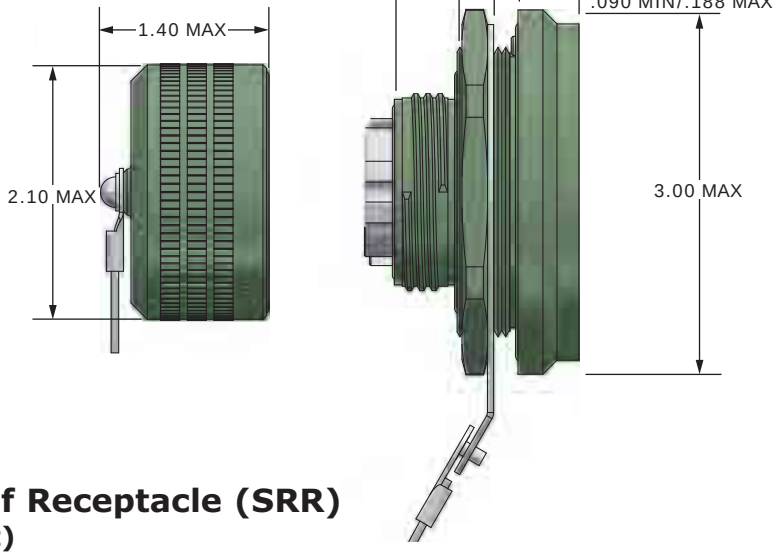
FS8H8000
TFOCA-II® Jam Nut Receptacle
(External Mount)



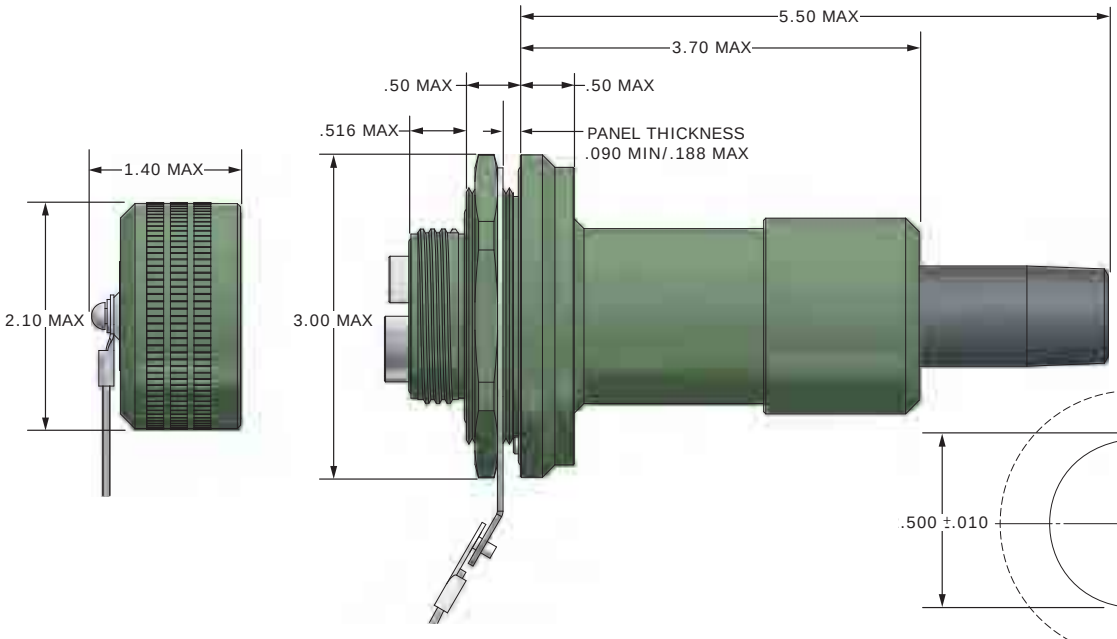
Panel Cut-Out



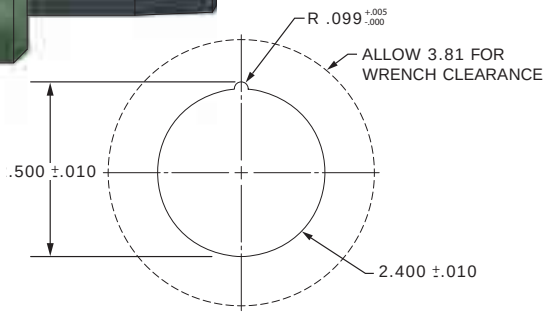
FS8H8080
TFOCA-II® Jam Nut Receptacle
(Internal Mount)



FS8H8280
TFOCA-II® Jam Nut Strain Relief Receptacle (SRR)
(Internal Mount)

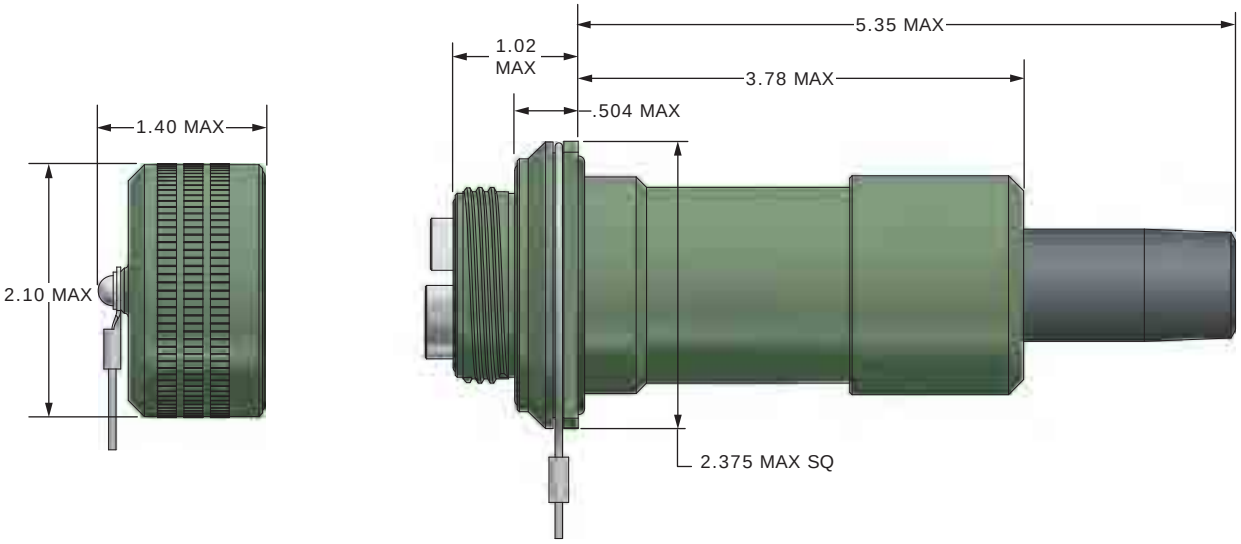


Panel Cut-Out
(Dimensions are the same for FS8H8080 & FS8H8280)

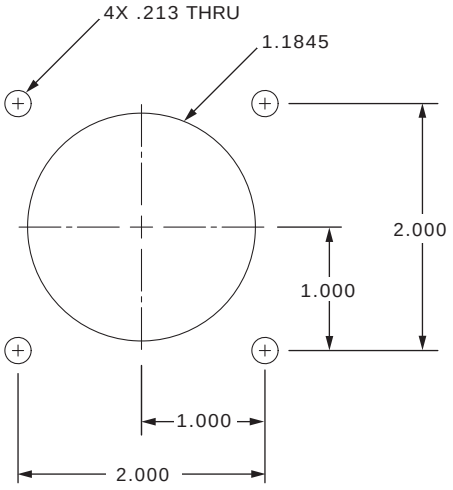


Dimensions are for reference only. Dimensions are in inches.

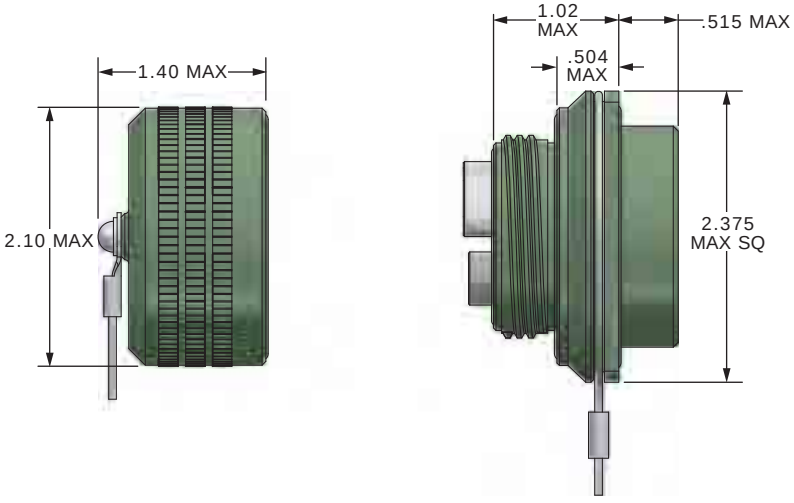
FS8H6200
TFOCA-II® Flange Mount Strain Relief Receptacle (SRR)
(External Mount)



Panel Cut-Out
(Dimensions are the same for FS8H6200 & FS8H6000)

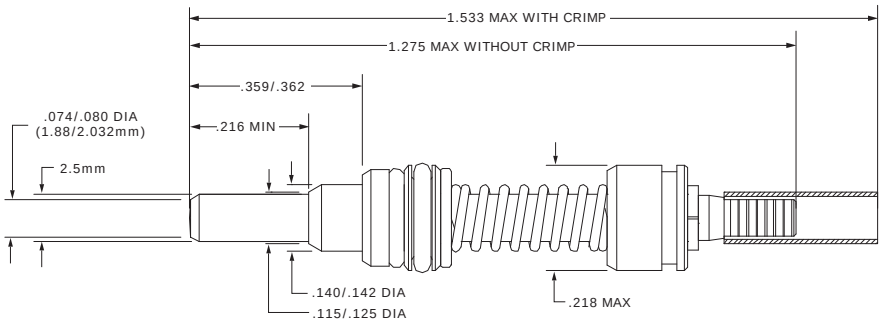


FS8H6000
TFOCA-II® Flange Mount Receptacle
(External Mount)



Dimensions are for reference only. Dimensions are in inches.

MTFP Termini (For TFOCA-II® Connectors)



The AFSI MTFP termini feature an innovative double-floating seal design that allows maximum terminus travel with minimum side forces transferred to the terminus. This AFSI design ensures maximum optical isolation and terminus sealing under the harshest conditions.

Parameter	Typical	Maximum
Insertion Loss (multimode) Per Mated Pair/Connection	0.30dB	0.75dB
Insertion Loss (single mode) Per Mated Pair/Connection	0.40dB	0.75dB
Back Reflection/Return Loss (SM-UPC polish)	-50dB	-40dB

Specification	Measurement/Detail
Operating Temperature	-46°C to +71°C
Storage Temperature	-55°C to +85°C
Mud	5 minute immersion, clean with water (per MIL-PRF-83526 requirements)
Water Immersion	EIA-455-40, Water, 1m, 48hr
Vibration (operational)	EIA/TIA-455-11
Shock	EIA/TIA-455-14, Condition A
Mating Durability	2,000 cycles per EIA/TIA-455-21

Dimensions are for reference only. Dimensions are in inches. Except where indicated.

TFOCA-III® 6 & 24-Ch Specifications

TFOCA-III®

The TFOCA-III® series of 6 & 24-channel fiber optic connectors are ideal for environmentally harsh conditions.

The TFOCA-III® design utilizes the latest technology in fiber optic connectivity by incorporating industry standard physical contact ceramic ferrules and alignment sleeves.

Features & Benefits

- Hermaphroditic design for versatility
- Removable insert cap
- 6 & 24-channel connector designs
- Improved cable retention strength
- Zinc alloy plating
- Commercial ceramic ferrule technology
- Solid core alignment sleeves
- Hermaphroditic dust cap
- Optional key positions
- Field repairable using existing parts
- Available in stainless steel and brass

Parameter	Typical	Maximum
Insertion Loss (multimode) Per Mated Pair/Connection	0.30dB	0.75dB
Insertion Loss (single mode) Per Mated Pair/Connection	0.40dB	0.75dB
Back Reflection/Return Loss (SM-UPC polish)	-50dB	-40dB

Specification	Measurement/Detail
Operating Temperature	-46°C to +71°C
Shock	EIA/TIA-455-14, Condition A
Vibration (operational)	MIL-STD-1344, Method 2500.1
Cable Retention	400 pounds minimum per EIA/TIA-455-6, 1hr (applies to plug and strain relief receptacles); 800 pounds typical
Twist	1,000 cycles per EIA/TIA-455-36
Cable Seal Flexing	100 cycles per EIA/TIA-455-1
Mating Durability	2,000 cycles per EIA/TIA-455-21
Crush Resistance	450 pounds minimum per EIA/TIA-455-26
EMI Shielding Effectiveness (receptacle only)	>60dB per IEEE-299, 15KHz to 10GHz

TFOCA-III® 6-Ch Ordering (Plug)

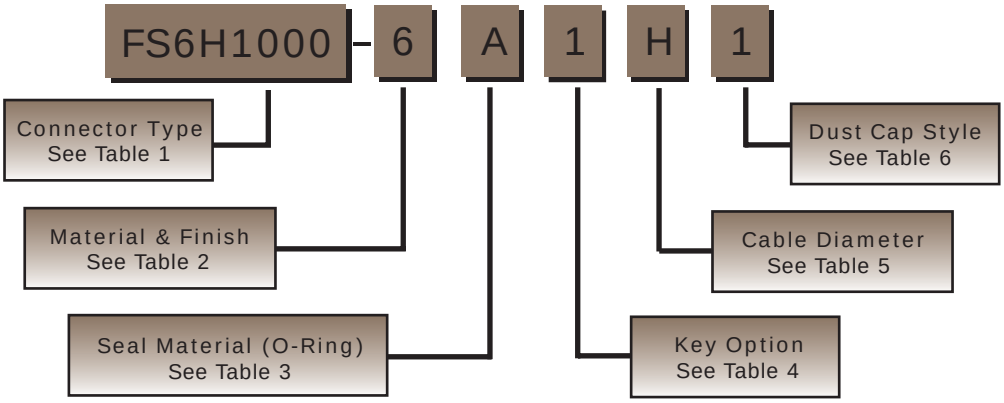


Table 1	
Connector Type	Part Number
TFOCA-III® Plug	FS6H1000

Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile	A

Table 4	
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5	
Cable Diameter inch (mm)	Dash Number
0.150-0.190 (3.81-4.83)	P
0.190-0.239 (4.83-6.07)	H
0.240-0.279 (6.10-7.09)	F
0.270-0.290 (6.86-7.37)	N
0.280-0.315 (7.11-8.00)	A
0.316-0.346 (8.03-8.79)	B
0.347-0.379 (8.81-9.63)	G
0.380-0.423 (9.65-10.74)	C
0.424-0.465 (10.77-11.81)	D

Table 6	
Dust Cap Style	Dash Number
Hermaphroditic, 6-Ch	1

STANDARD KEY
(Option 1)

KEY OPTION 3

KEY OPTION 2

Example Part Number - FS6H1000-6A1H1

FS6H1000 - TFOCA-III® Plug
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
A - Nitrile
1 - Key 1
H - 0.190-0.239 (4.83-6.07)
1 - Dust Cap Assy, Hermaphroditic

UNIVERSAL KEY
(Option 4)

Additional configurations available. Contact factory representative for details.

TFOCA-III® 6-Ch Ordering (Receptacles)

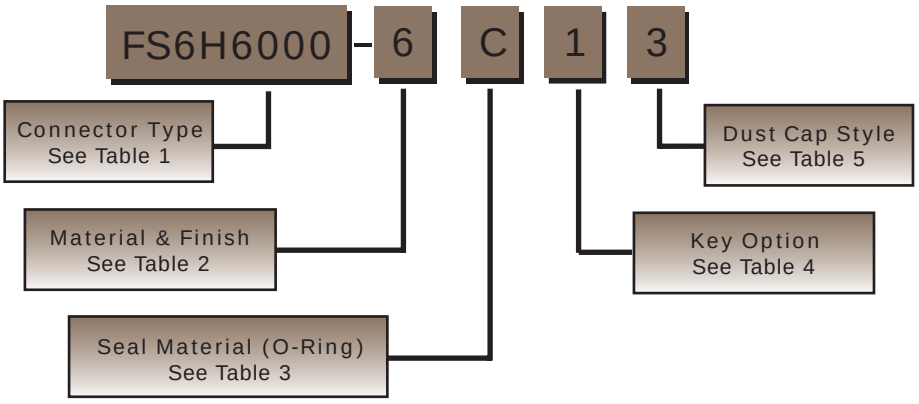


Table 1	
Connector Type	Part Number
TFOCA-III® Flange Mount Receptacle, External Mount	FS6H6000
TFOCA-III® Jam Nut Receptacle, External Mount	FS6H8000

Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile and Fluorosilicone	C

Table 4	
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5	
Dust Cap Style	Dash Number
Female, 6-Ch	3

STANDARD KEY
(Option 1)

KEY OPTION 3

KEY OPTION 2

UNIVERSAL KEY
(Option 4)

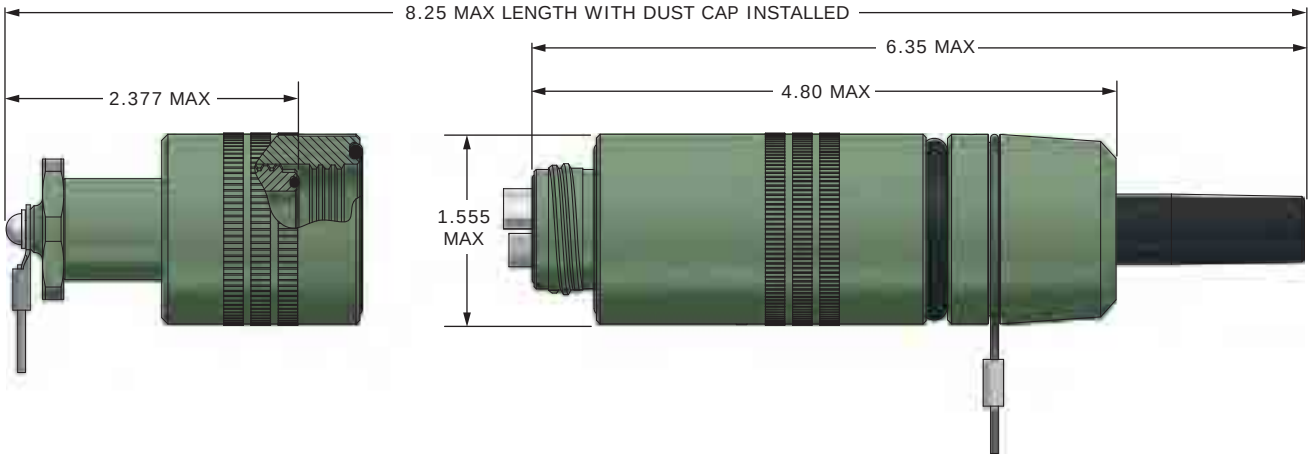
Example Part Number - FS6H6000-6C13

FS6H6000 - TFOCA-III® External Flange Mount Receptacle
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
C - Nitrile and Fluorosilicone
1 - Key 1
3 - Dust Cap Assy, Female

Additional configurations available. Contact factory representative for details.

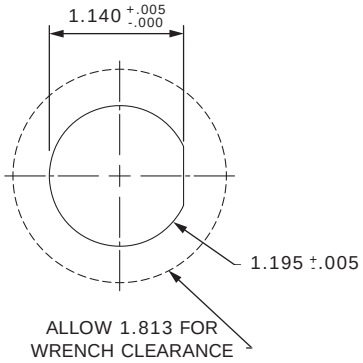
TFOCA-III® 6-Ch Plug & Receptacles

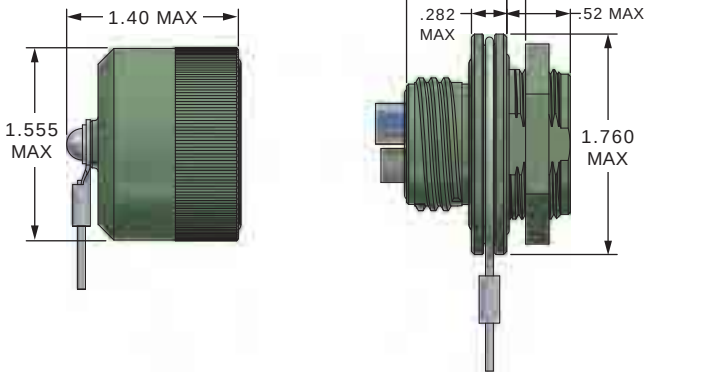
FS6H1000
TFOCA-III® Plug



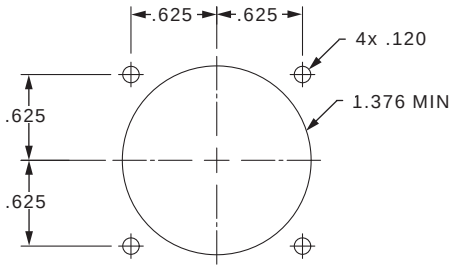
FS6H8000
TFOCA-III® Jam Nut Receptacle
(External Mount)

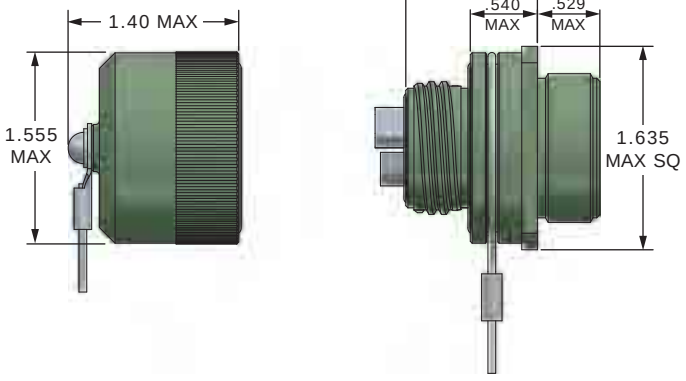
Panel Cut-Out





FS6H6000
TFOCA-III® Flange Mount Receptacle
(External Mount)





Dimensions are for reference only. Dimensions are in inches. Other configurations are available.

TFOCA-III® 24-Ch Ordering (Plug)

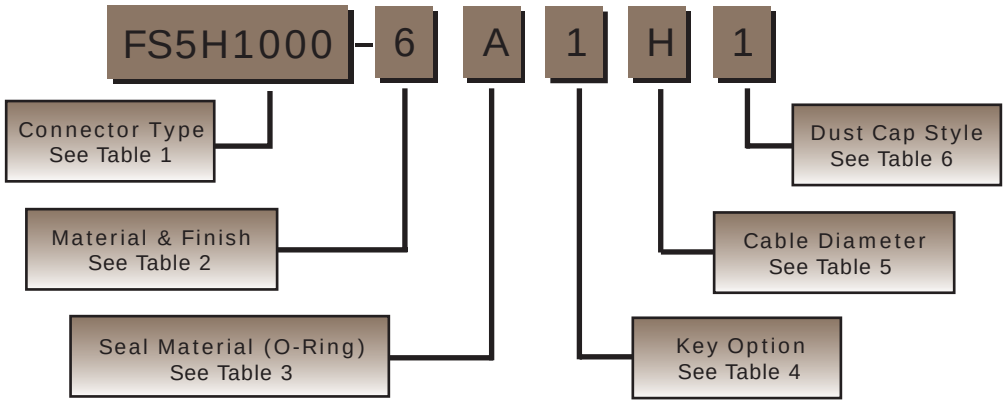


Table 1	
Connector Type	Part Number
TFOCA-III® Plug	FS5H1000

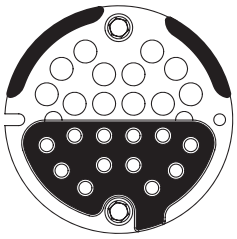
Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile	A

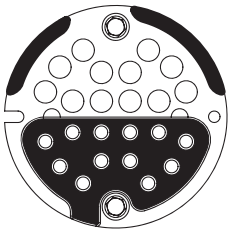
Table 4	
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5	
Cable Diameter inch (mm)	Dash Number
.240-.279 (6.1-7.1)	F
.280-.315 (7.1-8.0)	A
.316-.346 (8.0-8.8)	B
.347-.379 (8.8-9.6)	G
.380-.423 (9.7-10.7)	C
.424-.465 (10.8-11.8)	D
.466-.515 (11.8-13.0)	E
.516-.555 (13.1-14.1)	R
.600-.635 (15.2-16.1)	K
.635-.665 (16.1-16.9)	H
.669-.701 (17.0-17.8)	N
.705-.736 (17.9-18.7)	P
.750-.775 (19.0-19.8)	J
.776-.805 (19.7-20.4)	M

Table 6	
Dust Cap Style	Dash Number
Hermaphroditic, 24-Ch	1

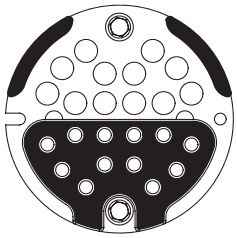


KEY OPTION 2

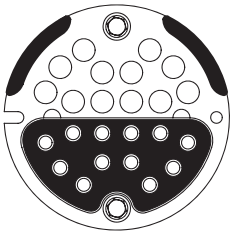


KEY OPTION 3

Example Part Number - FS5H1000-6A1H1
FS5H1000 - TFOCA-III® Plug
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
A - Nitrile
1 - Key 1
H - .635-.665 (16.1-16.9)
1 - Dust Cap Assy, Hermaphroditic



STANDARD KEY
(Option 1)



UNIVERSAL KEY
(Option 4)

Additional configurations available. Contact factory representative for details.

TFOCA-III® 24-Ch Ordering (Receptacles)

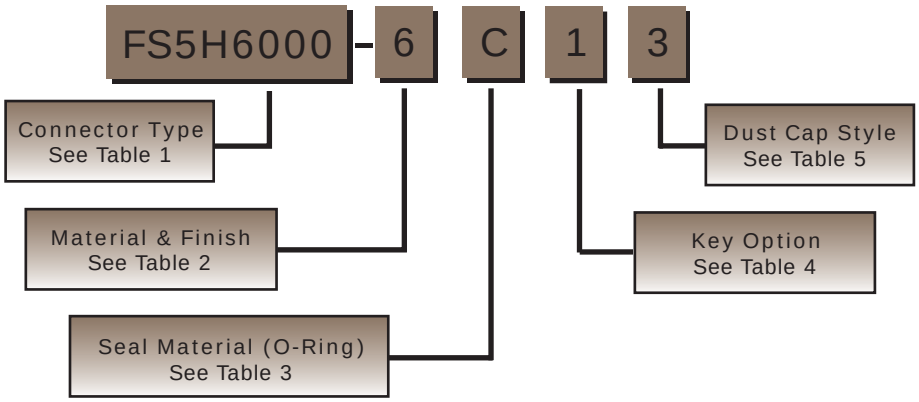


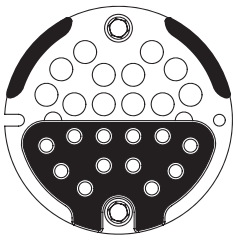
Table 1	
Connector Type	Part Number
TFOCA-III® Flange Mount Receptacle, External Mount	FS5H6000
TFOCA-III® Jam Nut Receptacle, External Mount	FS5H8000
TFOCA-III® Jam Nut Receptacle, Internal Mount	FS5H8080

Table 2	
Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

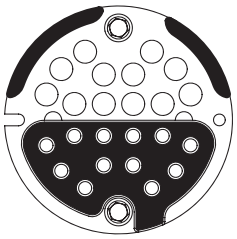
Table 3	
Seal Material (O-Ring)	Dash Number
Nitrile and Fluorosilicone	C

Table 4	
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5	
Dust Cap Style	Dash Number
Female, 24-Ch	3



STANDARD KEY
(Option 1)



KEY OPTION 2

Example Part Number - FS5H6000-6C13

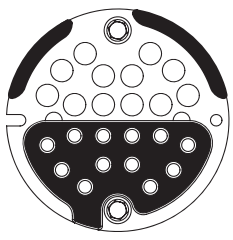
FS5H6000 - TFOCA-III® External Flange Mount Receptacle

6 - 6061-T6 Al ALY Zn-ALLOY Color OD

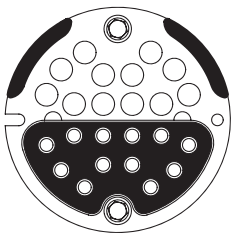
C - Nitrile and Fluorosilicone

1 - Key 1

3 - Dust Cap Assy, Female



KEY OPTION 3



UNIVERSAL KEY
(Option 4)

Additional configurations available. Contact factory representative for details.

TFOCA-III® 24-Ch Ordering (SRR Receptacles*)

FS5H8280 – 6 C 1 H 3

- 6 — Material & Finish See Table 2
- C — Seal Material (O-Ring) See Table 3
- 1 — Key Option See Table 4
- H — Cable Diameter See Table 5
- 3 — Dust Cap Style See Table 6

Table 1

Connector Type	Part Number
TFOCA-III® Flange Mount Strain Relief Receptacle, External Mount	FS5H6200
TFOCA-III® Jam Nut Strain Relief Receptacle, Internal Mount	FS5H8280

Table 2

Material & Finish	Dash Number
6061-T6 Al ALY Zn-ALLOY Color OD	6

Table 3

Seal Material (O-Ring)	Dash Number
Nitrile and Fluorosilicone	C

Table 4

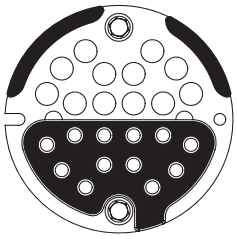
Key Option	Dash Number
Key 1	1
Key 2	2
Key 3	3
Key U	4

Table 5

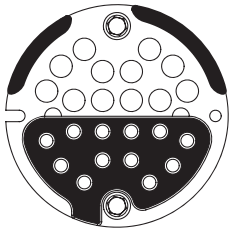
Cable Diameter inch (mm)	Dash Number
.240-.279 (6.1-7.1)	F
.280-.315 (7.1-8.0)	A
.316-.346 (8.0-8.8)	B
.347-.379 (8.8-9.6)	G
.380-.423 (9.7-10.7)	C
.424-.465 (10.8-11.8)	D
.466-.515 (11.8-13.0)	E
.516-.555 (13.1-14.1)	R
.600-.635 (15.2-16.1)	K
.635-.665 (16.1-16.9)	H
.669-.701 (17.0-17.8)	N
.705-.736 (17.9-18.7)	P
.750-.775 (19.0-19.8)	J
.776-.805 (19.7-20.4)	M

Table 6

Dust Cap Style	Dash Number
Female, 24-Ch	3



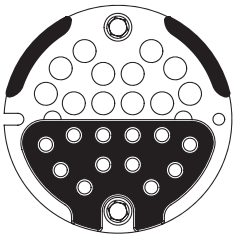
KEY OPTION 2



KEY OPTION 3

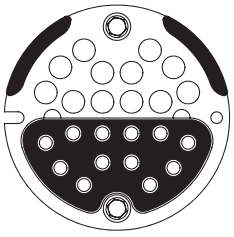
Example Part Number - FS5H8280-6C1H3

FS5H8280 - TFOCA-III® Jam Nut Strain Relief Receptacle
6 - 6061-T6 Al ALY Zn-ALLOY Color OD
C - Nitrile and Fluorosilicone
1 - Key 1
H - .635-.665 (16.1-16.9)
3 - Dust Cap Assy, Female



STANDARD KEY (Option 1)

*** Receptacle w/ Integrated Strain Relief**

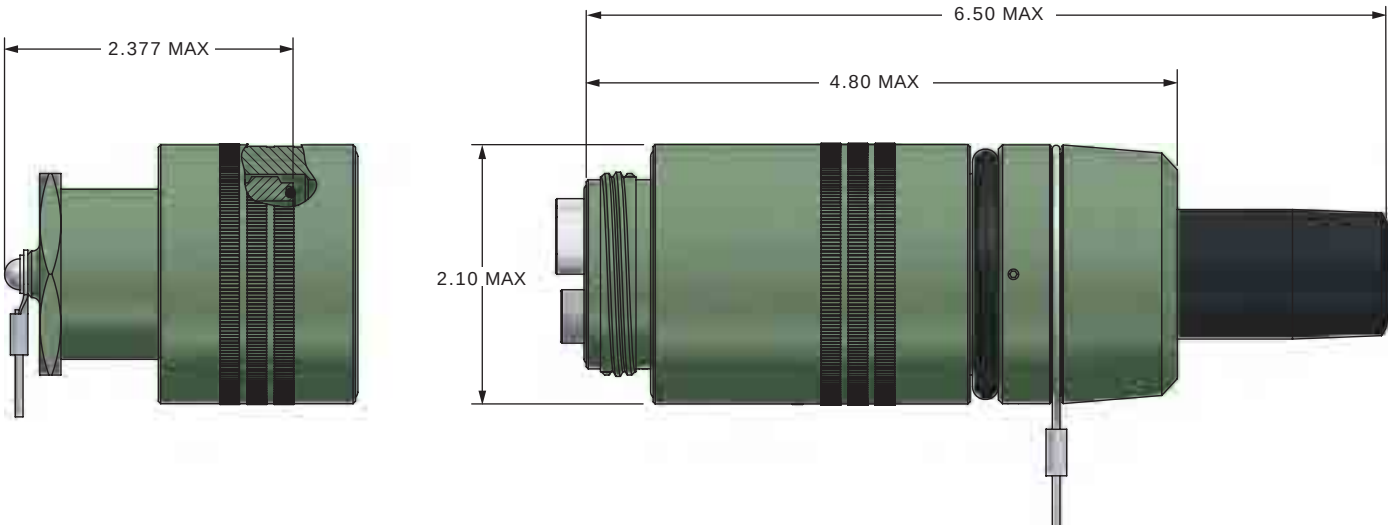


UNIVERSAL KEY (Option 4)

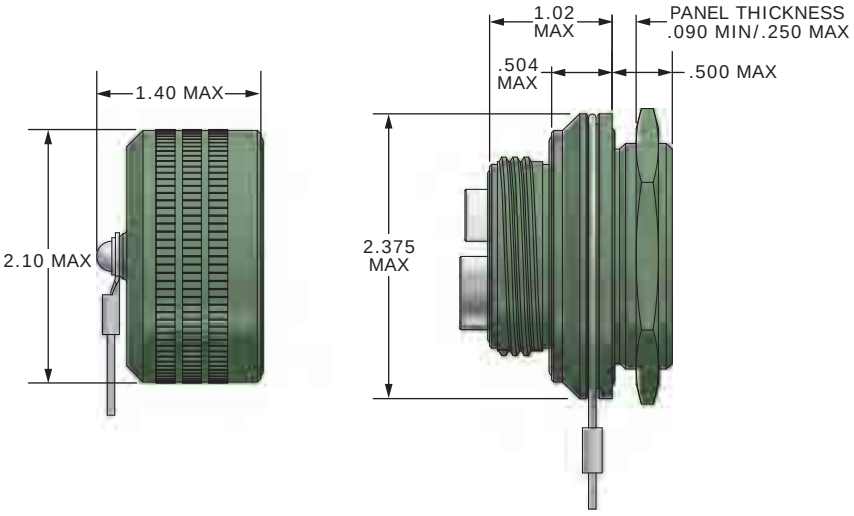
Additional configurations available. Contact factory representative for details.

TFOCA-III® 24-Ch Plug & Jam Nut Receptacle

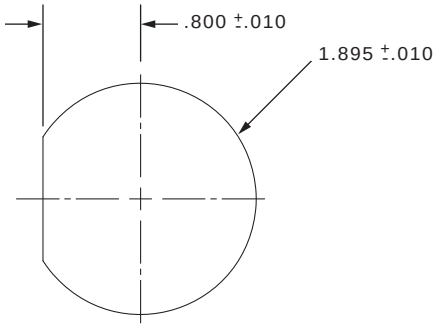
FS5H1000
TFOCA-III® Plug



FS5H8000
TFOCA-III® Jam Nut Receptacle
(External Mount)

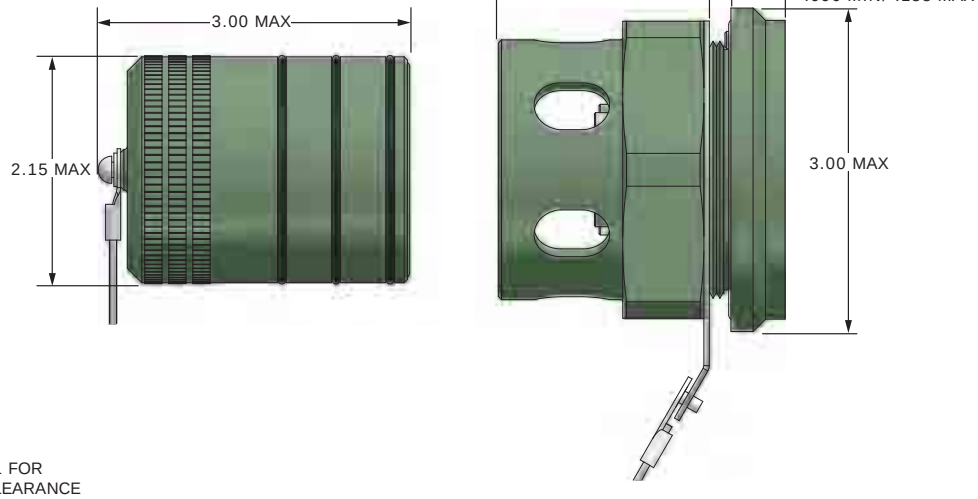


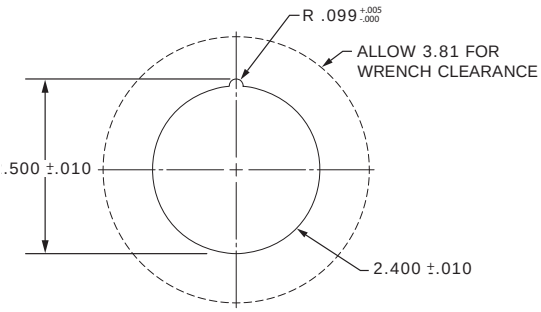
Panel Cut-Out



Dimensions are for reference only. Dimensions are in inches.

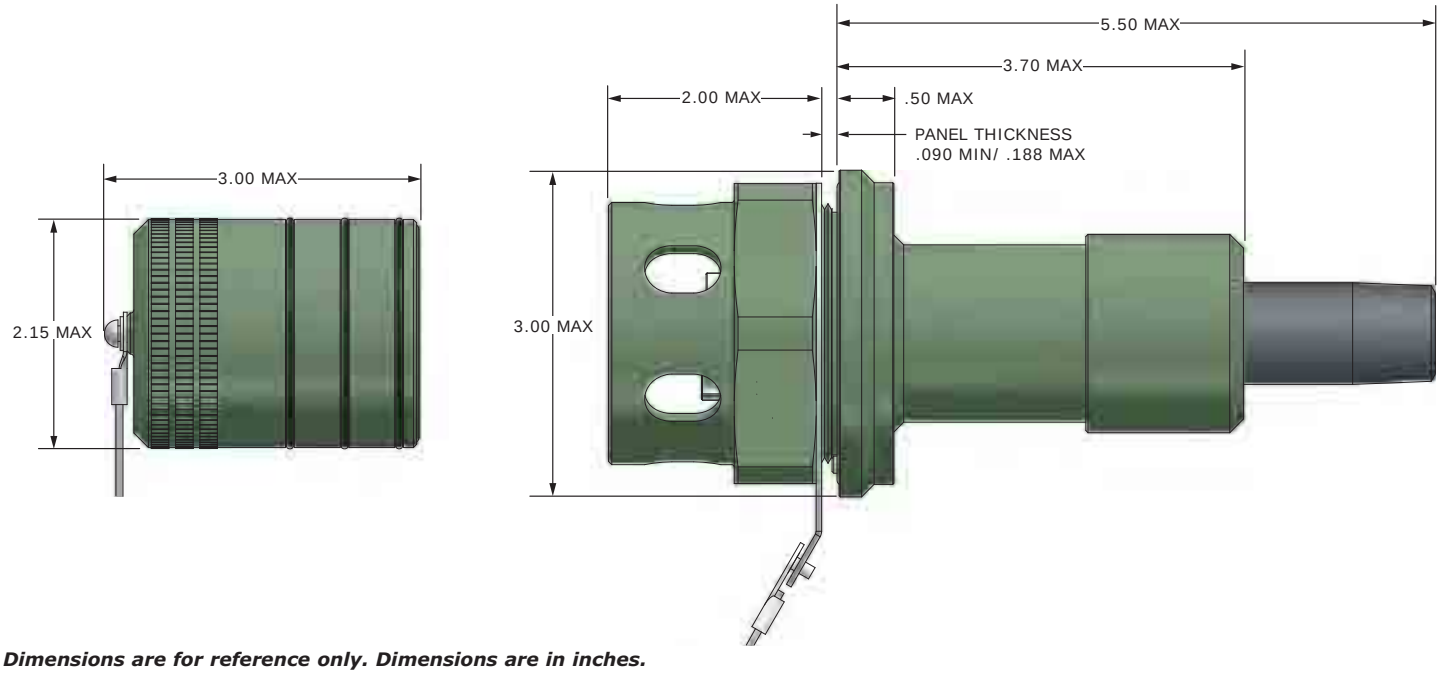
FS5H8080 TFOCA-III® Jam Nut Receptacle with Alignment Shroud (Internal Mount)





Panel Cut-Out
(Dimensions are the same for FS5H8080 & FS5H8280)

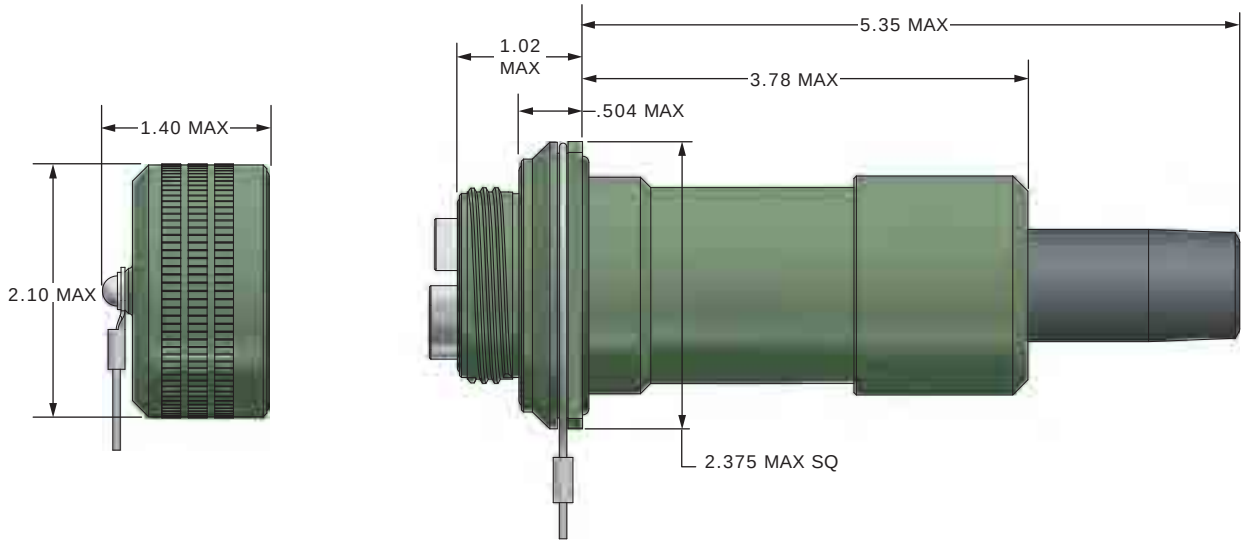
FS5H8280
TFOCA-III® Jam Nut Strain Relief Receptacle (SRR) with Alignment Shroud Jam Nut
(Internal Mount)



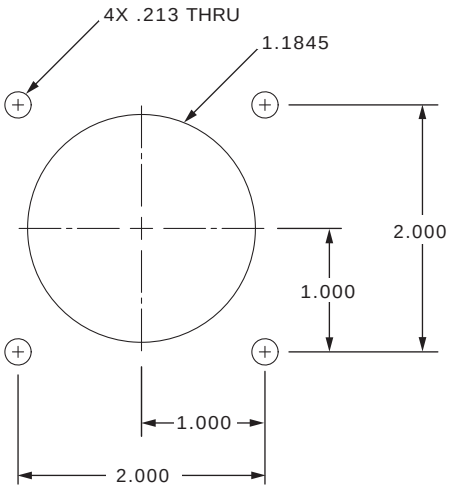
Dimensions are for reference only. Dimensions are in inches.

TFOCA-III® 24-Ch Flange Receptacles

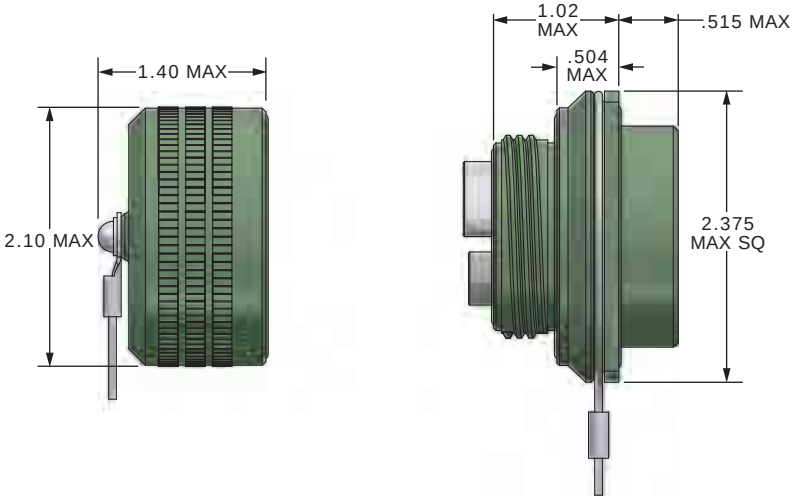
FS5H6200
TFOCA-III® Flange Mount Strain Relief Receptacle (SRR)
(External Mount)



Panel Cut-Out
(Dimensions are the same for FS5H6200 & FS5H6000)

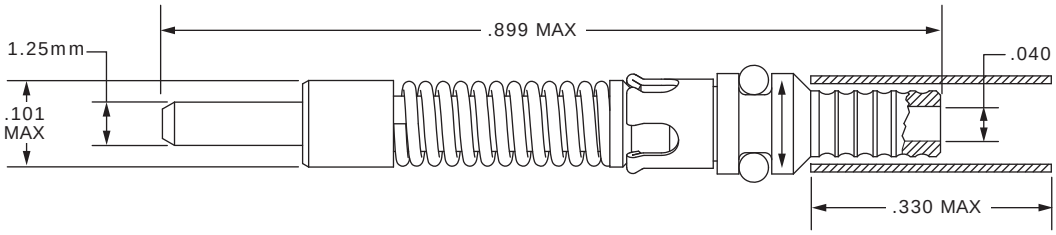


FS5H6000
TFOCA-III® Flange Mount Receptacle
(External Mount)



Dimensions are for reference only. Dimensions are in inches.

FSAF Termini (For TFOCA-III® Connectors)



The AFSI FSAF termini utilize 1.25mm ferrule technology to increase fiber density while maintaining the superior optical characteristics of physical contact termini. AFSI engineered the FSAF termini for use as pin or socket configurations using field proven robust components.

Parameter	Typical	Maximum
Insertion Loss (multimode) Per Mated Pair/Connection	0.30dB	0.75dB
Insertion Loss (single mode) Per Mated Pair/Connection	0.40dB	0.75dB
Back Reflection/Return Loss (SM-UPC polish)	-50dB	-40dB

Specification	Measurement/Detail
Operating Temperature	-46°C to +71°C
Storage Temperature	-55°C to +85°C
Mud	5 minute immersion, clean with water (per MIL-PRF-83526 requirements)
Water Immersion	EIA/TIA-455-40, Water, 1m, 48hr
Vibration (operational)	EIA/TIA-455-11
Shock	EIA/TIA-455-14, Condition A
Mating Durability	2,000 cycles per EIA/TIA-455-21

Dimensions are for reference only. Dimensions are in inches. Except where indicated.

TFOCA

In 1999, AFSI designed the TFOCA connector series as a direct replacement for the connector portion of the U. S. Army's legacy TFOCA (Tactical Fiber Optic Cable Assembly) equipment. This connector series has become known simply as "TFOCA." The AFSI TFOCA series is formally approved by CECOM (U. S. Army Communications Electronics Command, Fort Monmouth, NJ) and meets the performance criteria specified in MIL-C-83526. In addition, AFSI is fully qualified and formally approved by CECOM to fabricate cable assemblies using the AFSI TFOCA connector. These assemblies have been tested in accordance with MIL-C-49292.

The TFOCA connector is a 2-channel hermaphroditic design utilized for tactical deployable communications systems. This genderless characteristic allows for concatenation of cable assemblies without regard for connector interface compatibility.

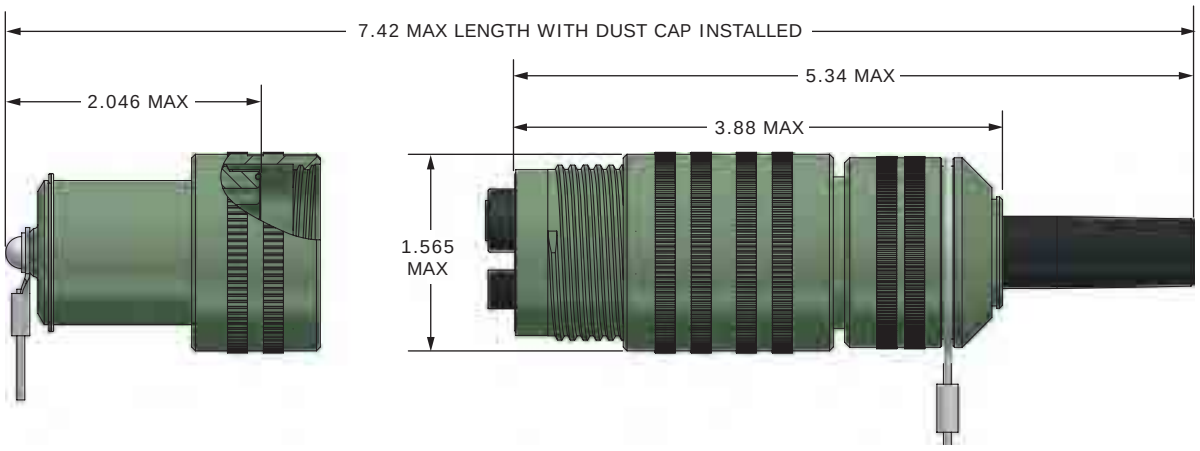
Features

- Hermaphroditic design ideal for deployable conditions
- Replacement for U. S. Army and U. S. Marine Corps legacy TFOCA (AT&T)
- Multimode
- Field maintainable and repairable
- Biconic termini

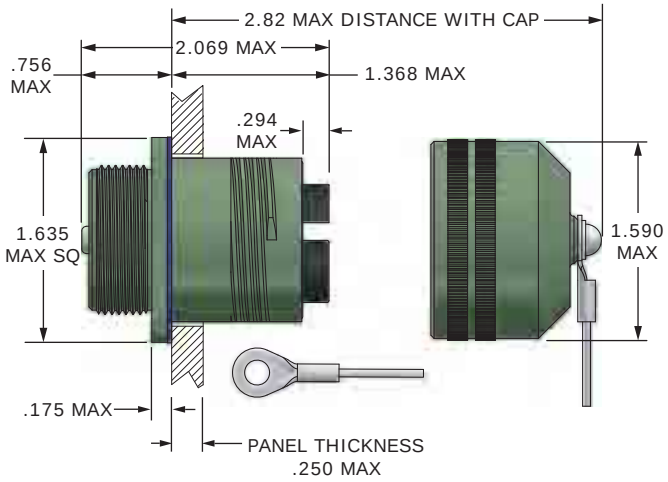
Parameter	Typical	Maximum
Insertion Loss (multimode) Per Mated Pair/Connection	>1.0dB	1.5dB

Specification	Measurement/Detail
Number of Channels	2-Channels
Field Maintainable	Yes. Only requires common tools (screwdriver). No special tools required
Fiber Type	50/125 radiation hardened fiber available
Operating Temperature	-10°C to +75°C
Mud	Per MIL-C-83526 /12 and /13
Shock	EIA/TIA-455-14, Condition A
Vibration	MIL-STD-1344, Method 2005.1
Cable Retention	400 pounds minimum per EIA/TIA-455-6, 1hr (applies to plug); 800 pounds typical
Twist	1,000 cycles per EIA/TIA-455-36
Cable Seal Flexing	100 cycles per MIL-STD-1344, Method 2017, Procedure 1
Mating Durability	2,000 cycles per EIA/TIA-455-21
Water Pressure	Per MIL-C-83526 /12 and /13 requirements
Ice Crush/Freezing Water Immersion	Per MIL-C-83526 /12 and /13 requirements
Impact	EIA/TIA-455-2
Crush Resistance	450 pounds minimum per EIA/TIA-455-26

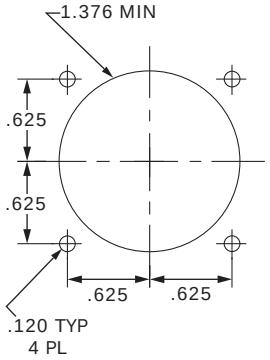
FS7H1000
TFOCA Plug



FS7H6000
TFOCA Flange Mount Receptacle

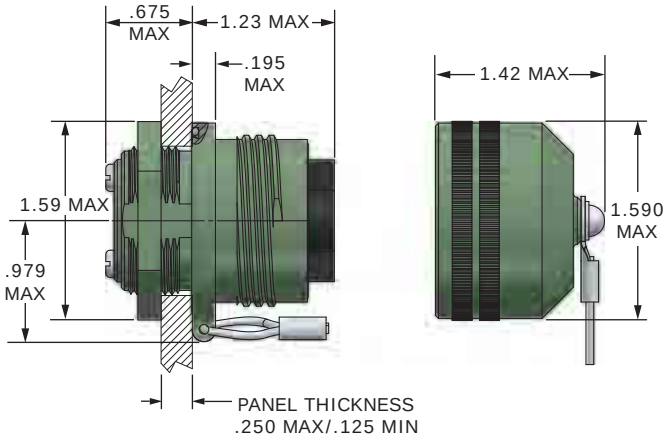


FS7H6000
Panel Cut-Out

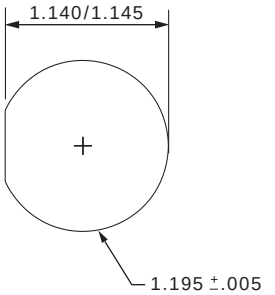


Dimensions are for reference only. Dimensions are in inches.

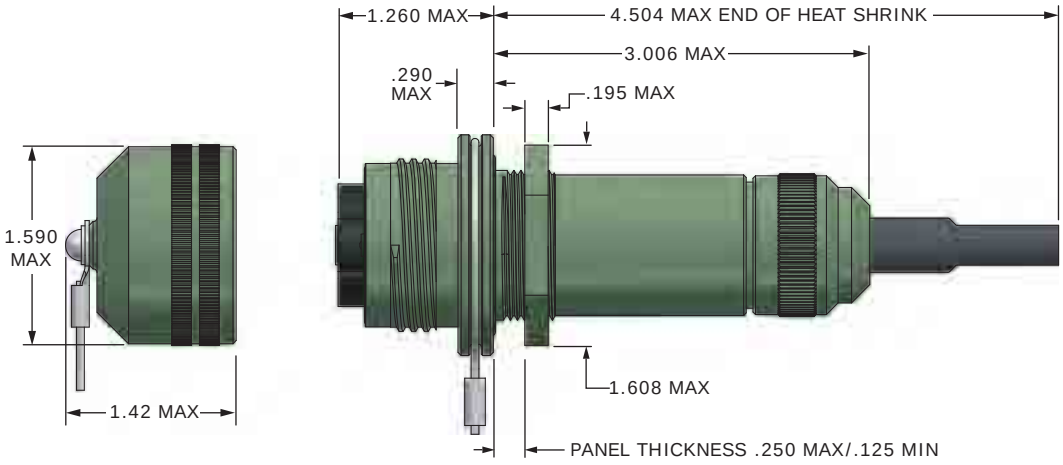
FS7H8000
TFOCA Jam Nut Receptacle



Panel Cut-Out
(Dimensions are the same for FS7H8000 & FS7H9000)



FS7H9000
TFOCA Jam Nut Strain Relief Receptacle (SRR)



Dimensions are for reference only. Dimensions are in inches.

THD Connectors

THD

AFSI designed and developed the Tactical High Density (THD) connectors to meet the ever-increasing demands of high density harsh environment fiber optic connectivity. THD series connectors are particularly suited for the reliable tactical connections required for digital communication on and near the battlefield, high bandwidth commercial or industrial applications. AFSI's multi-channel fiber optic connectors are designed to provide the best possible optical performance for applications with extreme environmental conditions. The THD series is another example of AFSI's leadership in high density tactical fiber optic connectors.

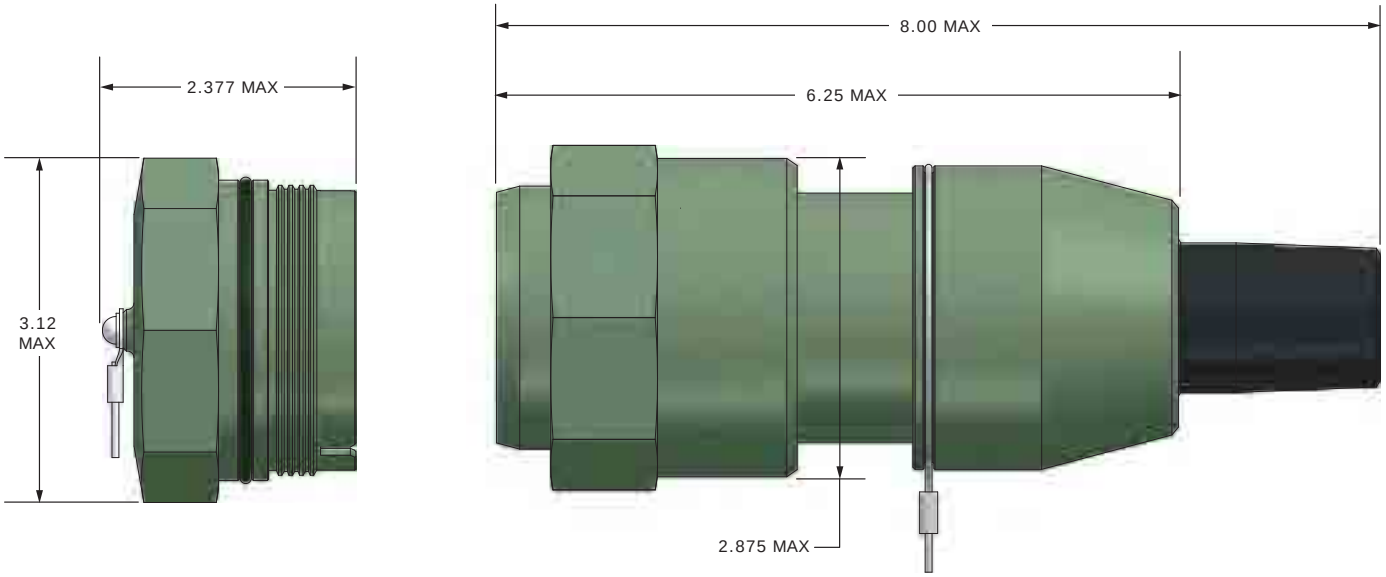
The THD series connectors build on the success of the AFSI TFOCA-II®. These ultra high density connectors utilize commercially available 1.25mm zirconia ceramic ferrules and alignment sleeves, resulting in exceptional insertion loss performance.

Features & Benefits

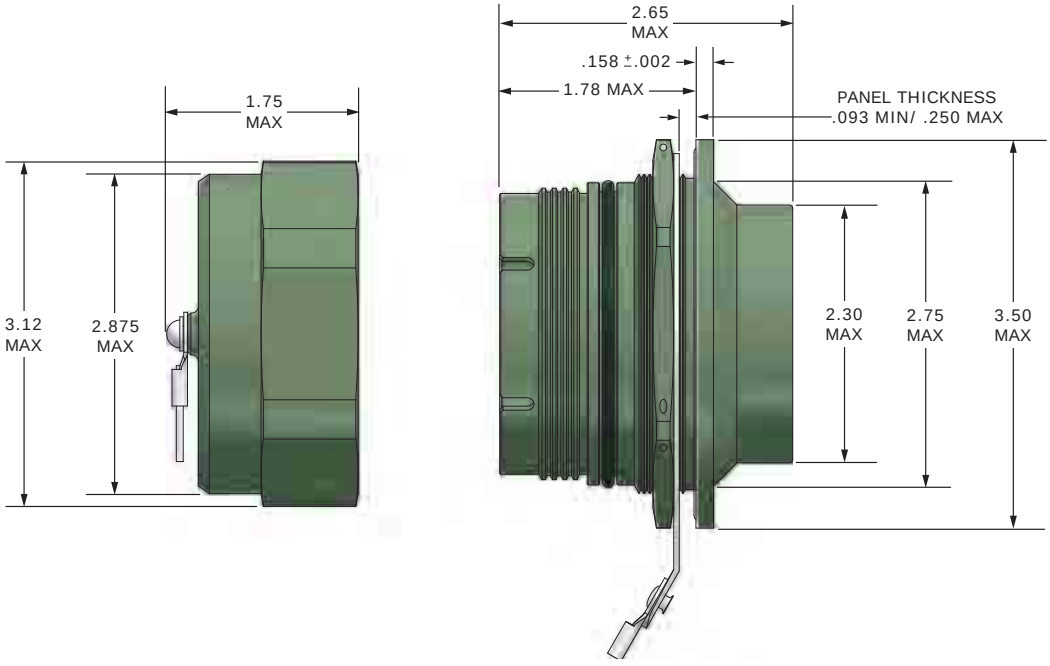
- 48 & 72-channel configurations
- Rugged high density connectors for harsh environments
- For use with multimode and single mode fiber
- Precision ceramic ferrule and alignment sleeve technology
- Rugged design for reliable operation beyond the limitations of high channel count commercial connectors
- 45º Backshell available

Specifications	Measurement/Detail
Number of Channels	48 & 72-Channels
Insertion Loss Per Mated Pair/Connection	62.5/125 Multimode fiber - 0.75dB Max/0.3dB Typ 9/125 Single mode fiber - 0.75dB Max/0.3dB Typ
Fiber Type	62.5/125 Multimode or 9/125 Single mode

THD##-1000 Plug
(Dimensions are the same for THD48 & THD72)

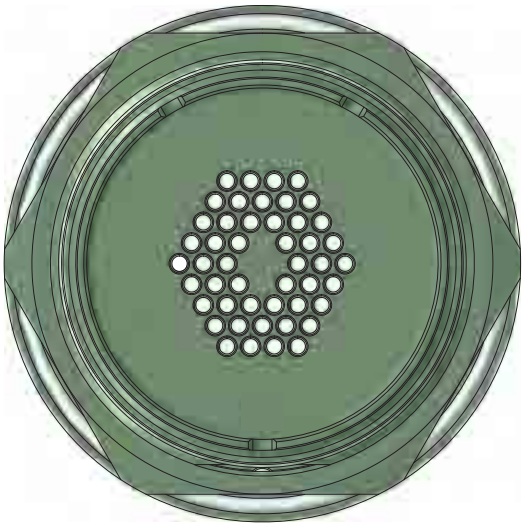


THD##-8080 Receptacle
(Dimensions are the same for THD48 & THD72)



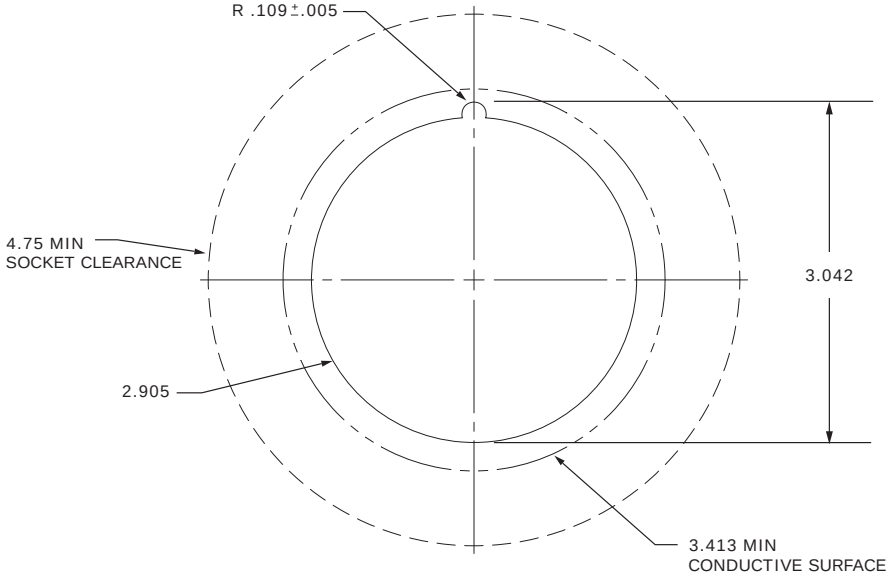
Dimensions are for reference only. Dimensions are in inches.

THD Connectors



THD48 Channel Insert Layout

Panel Cut-Out
(Dimensions are the same for THD48 & THD72)



THD72 Channel Insert Layout

Dimensions are for reference only. Dimensions are in inches.

MiniTAC

AFSI offers a new series of high performance, small form-factor, dual channel hermaphroditic fiber optic connectors, ideally suited for use in land tactical environments and outdoor applications. The MiniTAC 2-channel hermaphroditic connector is rugged yet compact. It is designed for use in tight spaces, yet durable enough for applications requiring multiple mating cycles found in harsh environments. The quarter turn bayonet coupling mechanism permits quick, single-handed mating and features audible tactile mating.

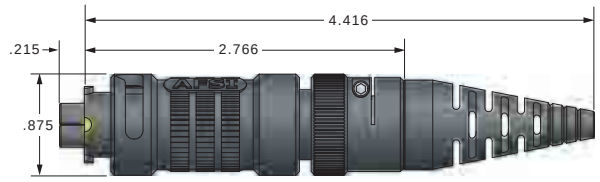
The connector design utilizes a quick and simple termination procedure, allowing users to terminate the connector on-site. AFSI offers simple tools required for assembly and maintenance. Test equipment is also available. AFSI offers training on the termination procedure at our facility in Allen, Texas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

Features & Benefits

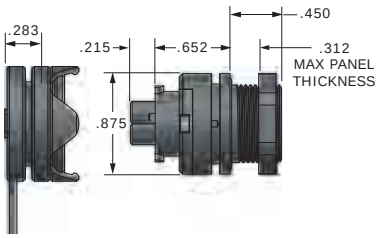
- Quarter turn bayonet coupling
- Single mode and multimode versions
- Audible/tactile click during mating
- Compact size
- Easy concatenation
- Environmentally sealed
- 2000 mating cycles durability
- Easy one hand quick connect/disconnect
- Jam nut receptacles support a panel thickness of between .063" & .312" (1.5mm to 8.0mm)
- Two dust cap options: 1 piece rubber cap or a 3 piece severe duty cap for harsh environments
- 2-6mm cable diameter range
- Multiple finishes available
- RoHS compliant
- Removable insert cap with captive alignment sleeve for easy cleaning & maintenance
- Reusable cable retention components
- 2mm termini

Specifications	Measurement/Detail
Insertion Loss SM Per Mated Pair/Connection	1.0dB Max
Return Loss Per Mated Pair/Connection	50dB Max
Insertion Loss MM Per Mated Pair/Connection	1.0dB Max

MiniTAC Plug



MiniTAC Receptacle



Dimensions are for reference only. Dimensions are in inches.

Expanded Beam Connectors

HMA*two* Expanded Beam Connector

The HMA*two* hermaphroditic fiber optic lens connector facilitates the inter-connection of multiple identical fiber optic cable assemblies (known as daisy chaining), eliminating the need for polarizing the assemblies and the use of in-line adapters.

The aluminum connector components are protected with a long-life anodize finish while the coupling ring and strain relief feature low temperature, protective "rubber" overmolds. This connector was designed for easy termination directly onto standard tactical cable without the use of special lens terminating tools.

CTOS Expanded Beam Connector

Amphenol's CTOS connector is a rugged expanded beam connector. The flat protective window, mounted on shock absorbers, provides a surface that is easy to clean in the field, improving environmental performance and protection.

This product offers a robust optical connection in a small size design (O.D. 38 mm) and allows for rapid deployment of high-speed transmission links in harsh environments.

The specific design of the lenses guarantees a large beam diameter and a low loss connection resistant to dust and dirt. The CTOS harnesses are easy to repair in the field with the CTOS and FTOS splice kits.

AXOS Expanded Beam Connector

Amphenol's AXOS miniature hermaphroditic connector offers a robust, protected optical connection in a small size (O.D. 27 mm). This indoor/outdoor quick-connect product allows "daisy-chaining" for variable link lengths.

A large beam diameter makes the connection resistant to environmental contamination, temperature variations and humidity. The design allows easy cleaning of mechanical and optical connector parts.

D38999 Cable Assemblies

Features & Benefits

- Provides hybrid capabilities
- Epoxy/polish termination
- Termini designed and manufactured to MIL-PRF-29504/4 and /5 specifications

Applications

- Land tactical
- Aerospace
- NAVAIR
- Telecommunications
- Industrial

Materials

- Available in aluminum, stainless steel or composite shell materials

Military Grade ST Connectors (MIL-C-83522)

Features & Benefits

- Stainless steel body with zirconia ceramic ferrule and fungus-resistant self-extinguishing boot
- Superior optical performance in extreme environmental conditions
- Mil-qualified series: high spring force for shock and vibration resistant critical in military applications
- Navy approved COTS series: for moderate shock and vibration environments
- RoHS compliant

Applications

- US Navy shipboard, surface and submarine, mission critical combat and communications systems
- Mobile tactical shelters
- Electronic battlefield networks
- Deployable outdoor harsh environment

Materials

- Ferrule: zirconia
- Body: stainless steel
- Boot: fungus resistant, self-extinguishing thermoplastic

ProClean Connectors

Features & Benefits

- Removabe insert cap with integral alignment sleeves
- Rapid field maintenance without the need for tools
- Utilizes TFOCA-II© technology
- Hermaphroditic design for versatility
- Optional key configurations

COTS refers to Commercial-Off-The-Shelf

Applications

- Land tactical
- Mining
- Oil, gas and geoscience industries
- Industrial
- Broadcast

Materials

- Aluminum
- Stainless steel
- Brass
- Other materials available

Finish

- Black anodize
- Other finishes available

Other Products

M28876 Connectors

Features & Benefits

- Available in 3 shell sizes: 13 (4-ch); 15 (6, 8-ch); 23 (18, 31-ch)
- Six keying options (plus universal keying for COTS product) for both plugs and receptacles
- Operates with all qualified single mode or multimode M29504/14 and /15 termini
- Complete line of straight, 45 degree and 90 degree backshells
- Fully intermateable and interchangeable with any qualified M28876 connector manufacturer
- Quickloc design enables faster maintenance or repair without complete dissemble of connector backshell assembly

Applications

- US Navy shipboard, surface and submarine, mission critical combat and communication systems
- Mobile tactical shelters and electronic battlefield networks
- Mobile emergency Telecommunications (MET) stations
- Deployable outdoors in harsh environments

Materials

- Aluminum (other materials available on COTS basis)

Finish

- Finish: olive drab cadmium over electroless nickel (other finishes available on COTS basis)

M29504 /14 & /15 Termini

Features & Benefits

- Pre-radius zirconia ferrule tip provides optimal insertion loss performance
- Laser marked TICC codes eliminate the need to decipher complex color code bands
- Precision ferrule alignment with captivated split zirconia sleeves
- Custom sizes available (COTS only)
- Integrated environmental seal on each terminus

Applications

- US Navy shipboard, surface and submarine, mission critical combat and communication systems
- Mobile tactical shelters and electronic battlefield networks

Materials

- Ferrule: zirconia ceramic
- Terminus body: stainless steel, passivated
- Retention clip: beryllium copper
- Alignment sleeve: ceramic
- Alignment sleeve hood: beryllium copper
- O-ring seal: fluorosilicone

E-O-E System

Features & Benefits

- E/O conversion integrated into the connector body or receptacle
- Efficient E-O-E conversion
- AFSI aramid fiber captivation system
- Multiple electrical formats
- Extended temperature ranges
- Tactical fiber optic cable (other cable options available upon request)
- Standard ranges: 2,000 meters for multimode and 40,000 meters for single mode
- Ruggedized for outdoor use
- Multiple channels
- Customized interfaces
- Low power consumption

Applications

- U.S. Army, Navy, Air Force & Marine Corps tactical and strategic deployments
- Seismic exploration
- Remote system operation
- Outdoor networks
- Communication shelters
- Broadcast
- Oil, gas and geoscience industries
- Industrial

COTS refers to Commercial-Off-The-Shelf

FS12 Pierside Connectors

Features & Benefits

- Hermaphroditic design
- Rugged design handles the rigors of deployment and harsh environment conditions
- Environmentally sealed connector
- Military qualified MIL-PRF-29504 /14 & /15 termini
- Removable insert cap
- Captive insert cap screw
- Sealed termini keep the optical path clear
- Field repairable using existing parts

Applications

- Umbilical cables used to interface between shore and ship networks
- U.S. Army, Navy, Air Force & Marine Corps tactical and strategic deployments
- Broadcast
- Oil, gas and geoscience industries
- Industrial

Materials

- Aluminum
- Other materials available

Finish

- Grey anodize
- Olive cadmium
- Other finishes available

Optron Connectors

Features & Benefits

- Designed IAW MIL-PRF-28876
- Available in 3 shell sizes: 13 (4-ch); 15 (6, 8-ch) and 23 (18, 31-ch)
- Inserts are interchangeable from plug to receptacle. Either can be operated with pin or socket termini
- Operates with all qualified single mode or multimode M29504/14 and /15 termini
- Complete line of straight, 45 degree and 90 degree backshells

Applications

- Shipboard/Pierside
- Land tactical
- Mining
- Oil, gas and geoscience industries
- Industrial
- Broadcast

Materials

- Aluminum
- Stainless steel
- Brass
- Other materials available

Finish

- Black anodize
- Other finishes available

LowPro Connectors

Features & Benefits

- Ultra-low profile (0.25") two channel connector
- Box or board mountable
- Positive locking system
- Operates with all qualified single mode or multimode M29504/14 and /15 termini
- Fiber/electrical contacts

COTS refers to Commercial-Off-The-Shelf

Applications

- Board level electronics
- Avionics modules and boxes
- Instrumentation
- Test equipment
- Field simulators

Materials

- Aluminum
- Other materials available

Finish

- Aluminum
- Other finishes available

Termination Kits, Tools, MTC's & Training

Termination Kits & Tools

AFSI offers kits for terminating most optical connectors in multiple markets. Available termination kits include: TFOCA-II®; TFOCA-III®; TFOCA; M28876; MIL-ST and M28876/MIL-ST combination. AFSI also offers customized kits and cleaning and consumable kits and replacements for broken or misplaced tools.

Fiber Optic Training

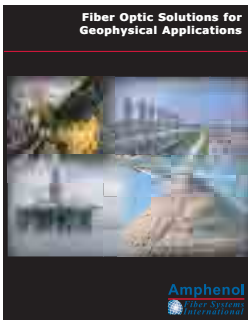
AFSI's TFOCA-II® training courses are designed for persons who install, test, troubleshoot or maintain fiber optic, deployable, land tactical interconnect systems. Focusing on the AFSI developed 4-channel hermaphroditic TFOCA-II® connectors; this class is ideal for military and civilian field personnel responsible for the maintenance and installation of tactical fiber optic networks.

Successful completion of these five-day courses and tests qualifies the student to receive a certification from AFSI on the TFOCA-II® & TFOCA connectors.

AFSI also offers training on all of our products and industry standard fiber optic connectors

We are certified by the Electronics Technicians Associations (ETA) to offer the Fiber Optics Installer (FOI) and the Fiber Optics Technician (FOT) certifications for an additional cost.

Geophysical Applications



Fiber Optic Solutions

M28876

Notes

WIT 위트솔루션즈
Wise Industrial Technology

(주)위트솔루션즈
서울시 송파구 송파대로 167
문정역테라타워 A동 404호
Tel:02-2054-8688
E-mail:sales@witsolutions.co.kr
Website:www.witsolutions.co.kr