

# PRODUCT CATALOGUE

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Fiber Optical Interconnect  
& Fiber Optical Sensing

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T&S Communication Co., Ltd. (SZSE: 300570) is a publicly listed, high-tech optical communications company specializing in core optical components and integrated modules. Founded in 2000, T&S has established itself as a global supplier of high-performance optical connectivity solutions for data centers, cloud computing, telecom networks, and next-generation AI and computing infrastructure.

A global leader in MTP®/MPO high-density fiber-optic connectors and one of the world's largest ceramic ferrule manufacturers, T&S delivers a vertically integrated portfolio spanning passive and active optical components—including high-density cable assemblies, PLC splitters, WDM devices, high-speed transceivers, AOCs, and key optical subcomponents. With advanced manufacturing capabilities in China and Vietnam, the company serves leading cloud service providers, system vendors, and data center operators in more than 60 countries worldwide.

With a long-term focus on optical connectivity and sensing technologies, T&S continues to build reliable, forward-looking solutions for an increasingly connected world.

## Company Overview

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# Ceramic Ferrule

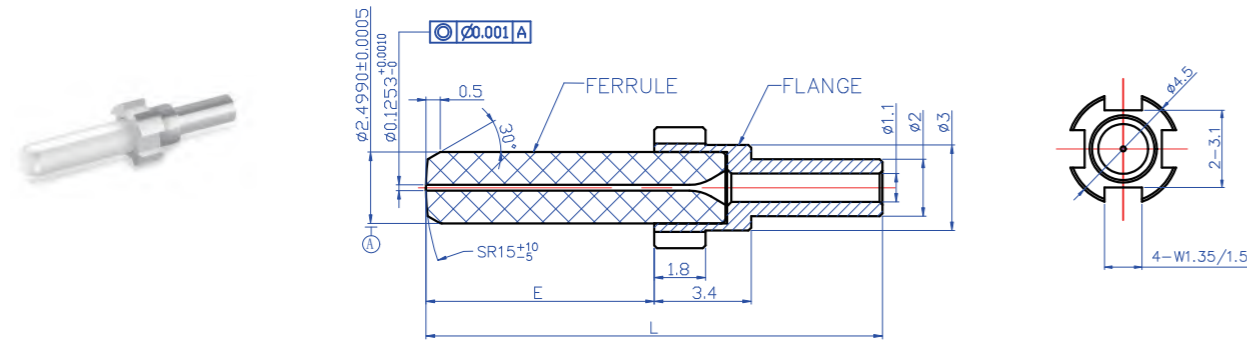
## Global Leadership in High-Precision Ceramic Ferrules

T&S is one of the world's leading manufacturers and suppliers of ceramic ferrules, with origins tracing back to China's earliest ceramic ferrule production. Leveraging decades of process expertise, the company delivers high-precision ferrule solutions to leading cable assembly manufacturers and system integrators worldwide.

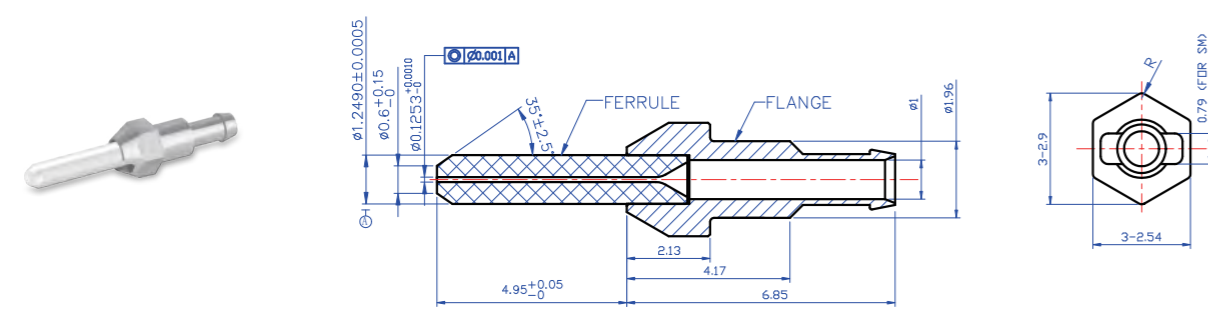
With strong in-house capabilities from ceramic preform fabrication to finished ferrule processing, T&S offers flexible customization, industry-leading sub-micron machining accuracy, and highly automated mass production. Large-scale capacity, consistent quality, and reliable delivery make T&S a long-term partner for high-performance optical connectivity applications.

## Standard Ferrule

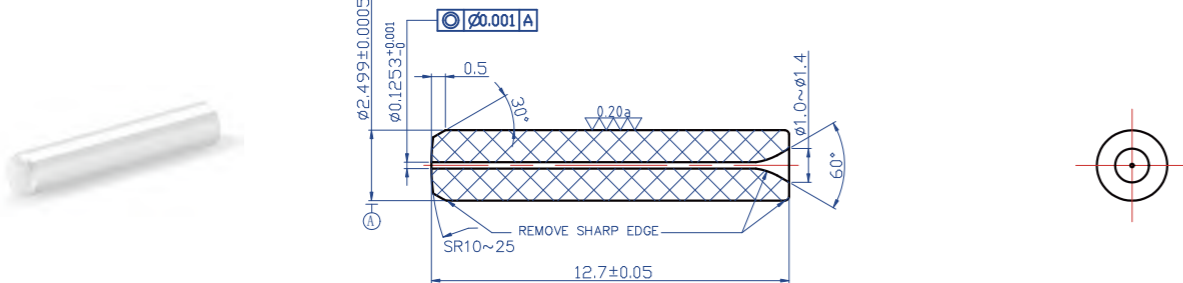
### SC with flange



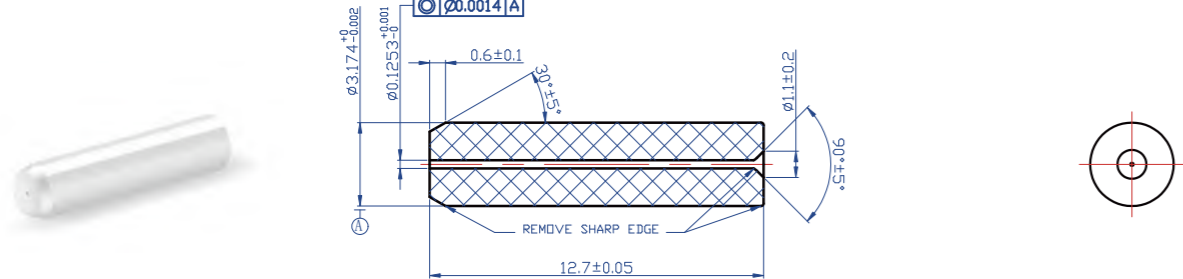
### LC with flange



### ST/SM/PC

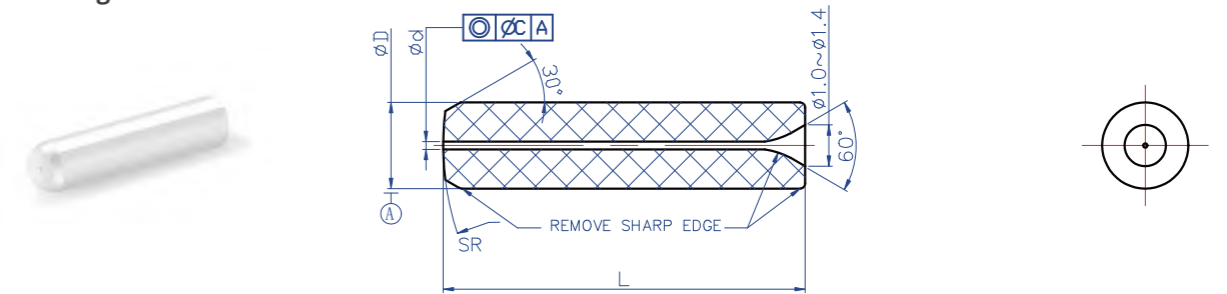


### SMA/SM



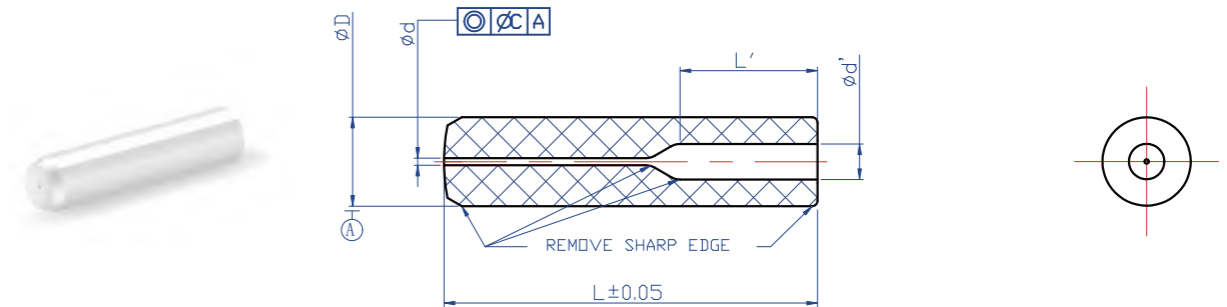
## Non-standard Ferrule

### Large Hole Ferrule



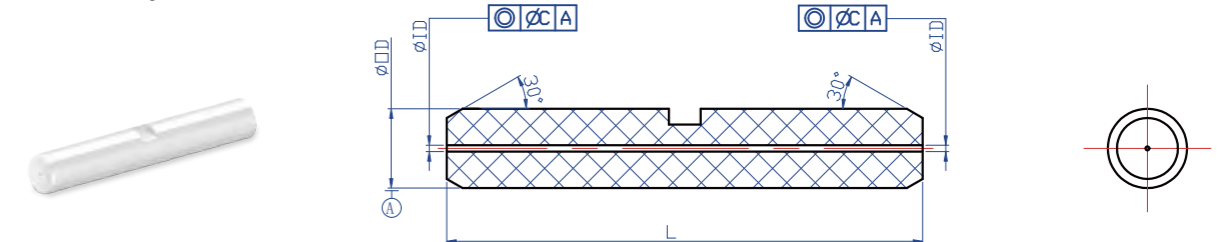
Part No.	Unit	FEN-LH-SC	FEN-LH-LC	FEN-LH-SMA	FEN-LH-SDL
Outside Diameter	mm	$\phi 2.4990$	$\phi 1.2490$	$\phi 3.1740$	$\phi 0.7 \sim \phi 3.0$
OD Tolerance	mm	$\pm 0.001$	$+0.005/-0.0015$	$+0/-0.004$	$\pm 0.001$
Length	mm	$10.50 \pm 0.05$	$6.40 \pm 0.1/-0$	$12.70 \pm 0.05$	$2.50 \sim 25$
ID Range	$\mu m$	128~200	201~400	401~600	601~750
ID Tolerance	$\mu m$	$\leq 5$	$\leq 10$	$\leq 10$	$\leq 20$
Concentricity	$\mu m$	$\leq 10$	$\leq 20$	$\leq 40$	NA

### Funnel Ferrule



Part No.	Unit	FEN-SC-Funnel-1	FEN-LC-Funnel-2
Outside Diameter	mm	$\phi 1.8 \sim \phi 2.50$	$\phi 1.00 \sim \phi 1.25$
Inner Diameter	mm	$\phi 0.125 \sim \phi 0.127$	
ID Range	mm	$\phi 1.00$	$\phi 0.4$
Concentricity	mm	$\leq 0.001$ (Single mode); $\leq 0.004$ (Multimode)	
Inner Hole Length	mm	6(max)	4(max)
Ferrule Length	mm	10.50	6.45

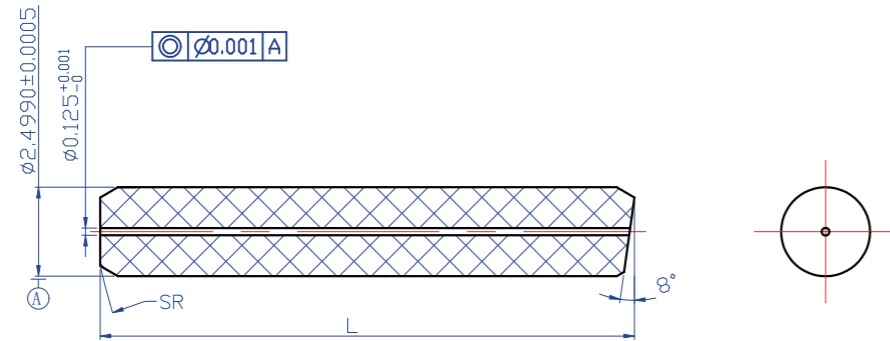
### Other Specified Ferrule



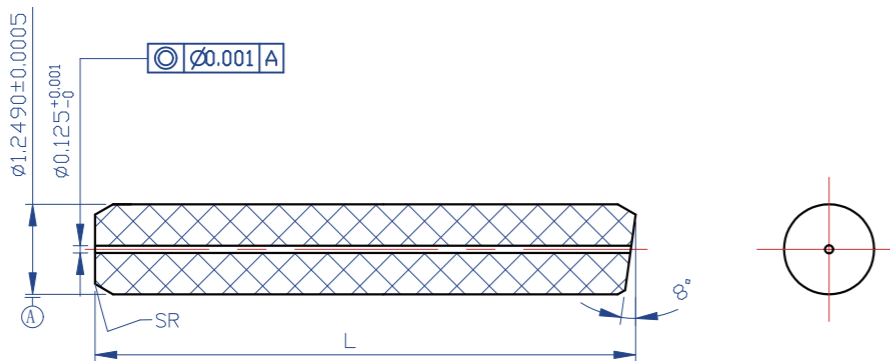
Part No.	Unit	FEN-SC-1	FEN-LC-2
Outside Diameter	mm	$\phi 2.4990 \pm 0.0005$	$\phi 1.2490 \pm 0.0005$
Inner Diameter	mm	$\phi 0.125 \sim \phi 0.127$	
Concentricity	mm	$\leq 0.001$ (Concentricity assurance at both ends)	
Slot		Slot or no slot	
Length	mm	2.0 ~ 24	

# Fiber Stub

## FES-SC-PA



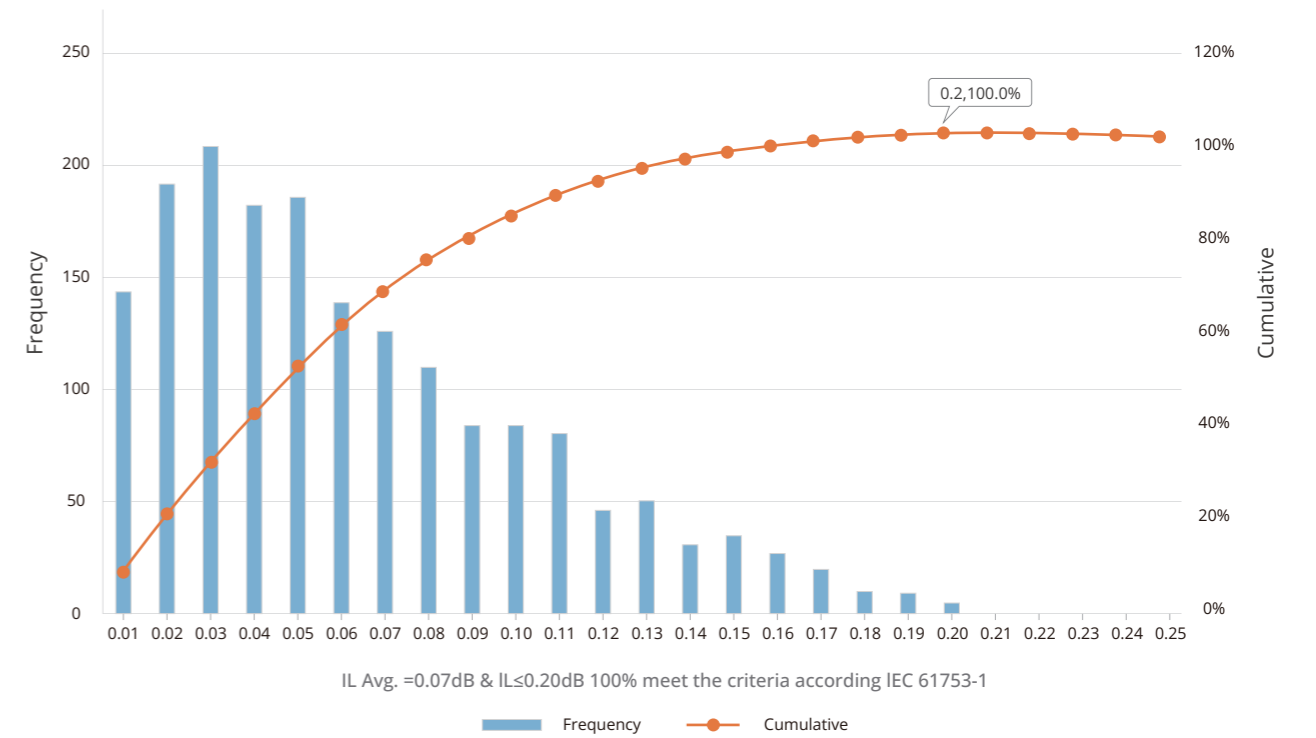
## FES-LC-PA



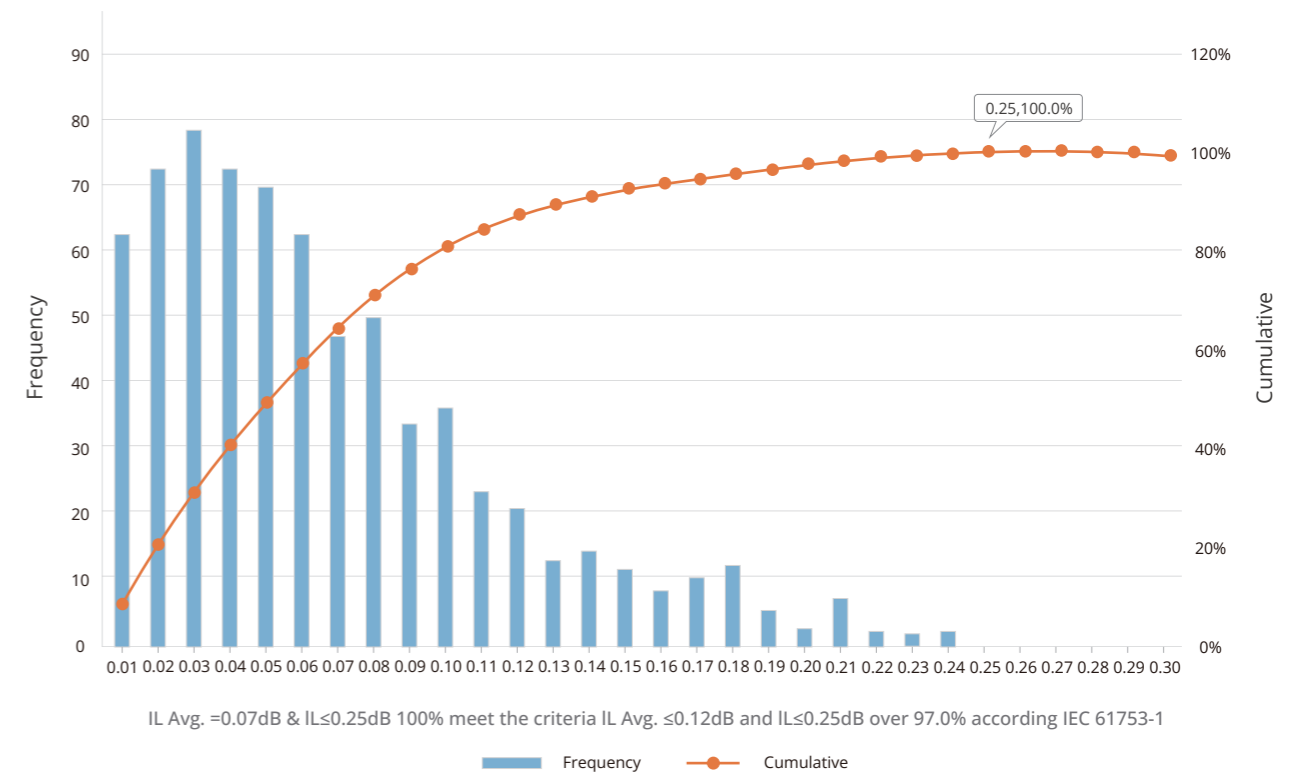
Type	Unit	SC SM Stub	LC SM Stub
Outside Diameter	mm	$\phi 2.4990 \pm 0.0005$	$\phi 1.2490 \pm 0.0005$
Inner Diameter	mm		$\phi 0.125_{-0}^{+0.001}$
Concentricity	mm		$\leq 0.001$
Length	mm		5~24

# Grade B Ferrule

## IL Distribution - Grade B LC (Mated with Master Cord)



## IL Distribution - Grade B LC (Random Mating)



## ROSA/TOSA Receptacle



ROSA LC Receptacle



TOSA Receptacle

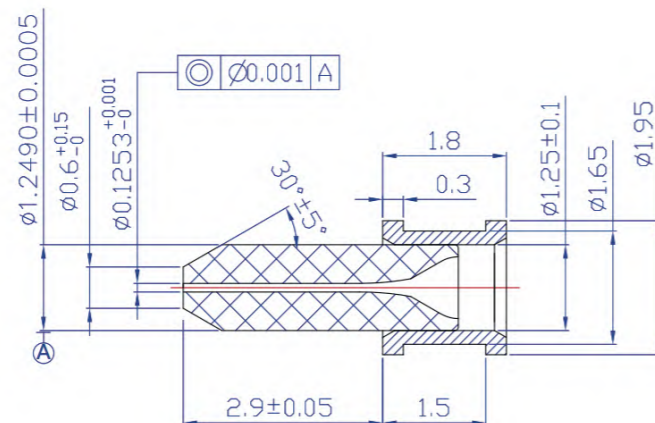
### Features

- Both SC and LC receptacle are available
- Customized design and production
- Excellent stability, Reliability and Exchangeability
- Storage Temperature Range: -40°C ~ +85°C

### Specification

Stub Concentricity	Insertion Loss	Return Loss	Split Sleeve	Bushing	Retainer	Wiggling Test
μm	dB	dB	-	-	-	-
≤0.7	≤0.2	≥45	Ceramic	SUS 316F	SUS 316F	IEC 62150-3-2015

## Module Ferrule



# MT Ferrule

Quality comparable to leading global suppliers

T&S MT ferrule portfolio spans 12- to 48-fiber configurations and is complemented by a full range of MPO connector components, guide pins, and accessories. Supported by in-house mold design and precision machining capabilities, T&S ensures flexible customization and consistent, scalable production for advanced connector applications.





## MT Ferrule

T&S delivers high-precision MT ferrules engineered to meet the performance standards of global industry leaders, enabling reliable MPO/MT interconnects for data centers and high-density optical systems.

### Standard & Compliance


- IEC 61754
- GR-1435-CORE
- RoHS
- REACH

### 12/16/24/36/48F Standard Ferrules

	Ferrule	Grade	Fiber Hole Diameter (mm)	Guide Pin Hole Diameter (mm)	Insertion Loss (dB)
	12F	SM Super Low Loss	0.125+0.0005/-0	0.6990+0.0006/-0	Typical=0.1, Max≤0.25
		SM Low Loss	0.125+0.001/-0	0.6990+0.0006/-0	Typical=0.12, Max≤0.35
		SM Standard	0.125+0.001/-0	0.7+0/-0.001	Typical=0.25, Max≤0.7
		MM Low Loss	0.125+0.002/-0	0.7+0/-0.001	Typical=0.12, Max≤0.35
		MM Standard	0.125+0.002/-0	0.7±0.001	Typical=0.25, Max≤0.5
	16F	SM Low Loss	0.125+0.001/-0	0.5490+0.0006/-0	Typical=0.12, Max≤0.35
		SM Standard	0.125+0.001/-0	0.55+0/-0.001	Typical=0.25, Max≤0.7
		MM Low Loss	0.125+0.002/-0	0.55+0/-0.001	Typical=0.12, Max≤0.35
		MM Standard	0.125+0.002/-0	0.55±0.001	Typical=0.25, Max≤0.5
	24F	SM Low Loss	0.125+0.001/-0	0.6990+0.0006/-0	Typical=0.12, Max≤0.35
		SM Standard	0.125+0.001/-0	0.7+0/-0.001	Typical=0.25, Max≤0.7
		MM Low Loss	0.125+0.002/-0	0.7+0/-0.001	Typical=0.12, Max≤0.35
		MM Standard	0.125+0.002/-0	0.7±0.001	Typical=0.25, Max≤0.5
	36F	SM Low Loss	0.125+0.001/-0	0.6990+0.0006/-0	Typical=0.12, Max≤0.35
		SM Standard	0.125+0.001/-0	0.7+0/-0.001	Typical=0.25, Max≤0.7
		MM Low Loss	0.125+0.002/-0	0.7+0/-0.001	Typical=0.12, Max≤0.35
		MM Standard	0.125+0.002/-0	0.7±0.001	Typical=0.25, Max≤0.5
	48F	SM Standard	0.125+0.001/-0	0.7+0/-0.001	Typical=0.25, Max≤0.7
		MM Low Loss	0.125+0.002/-0	0.7+0/-0.001	Typical=0.12, Max≤0.35
		MM Standard	0.125+0.002/-0	0.7±0.001	Typical=0.25, Max≤0.5

## MT Ferrule

### Non-Standard Ferrules

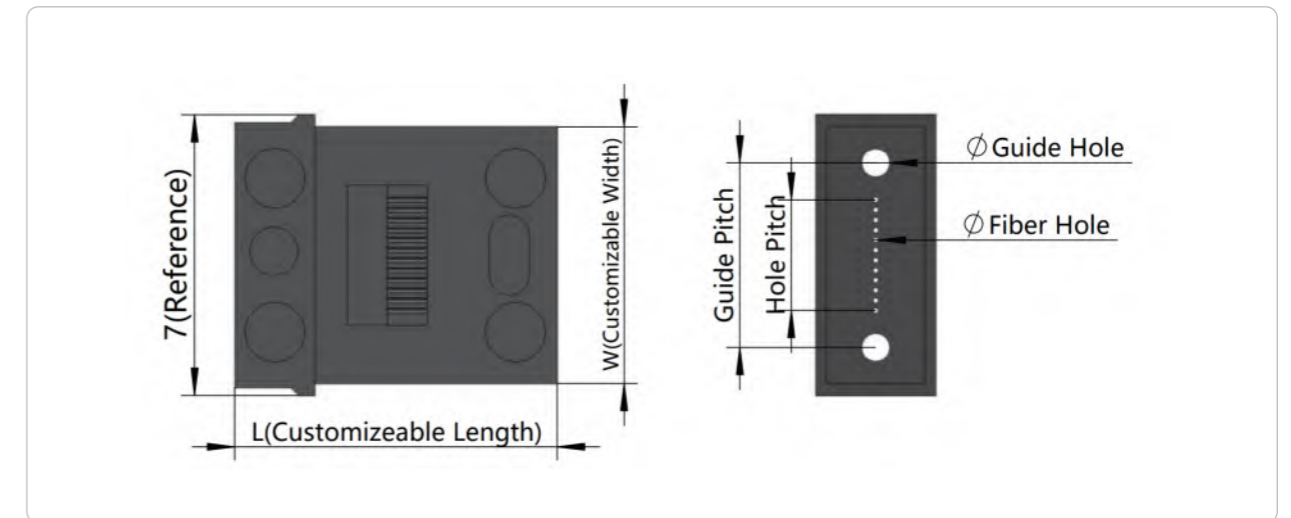
	Ferrule	Grade	Fiber Hole Diameter (mm)	Guide Pin Hole Diameter (mm)	Insertion Loss (dB)
	Mini-12	MM Low Loss	0.125+0.002/-0	0.7+0/-0.001	Typical=0.12, Max≤0.35
		MM Standard	0.125+0.002/-0	0.7±0.001	Typical=0.25, Max≤0.5
	Mini-24	MM Low Loss	0.125+0.002/-0	0.7+0/-0.001	Typical=0.12, Max≤0.35
		MM Standard	0.125+0.002/-0	0.7±0.001	Typical=0.25, Max≤0.5

### More Customized Ferrules

T&S vertically integrated manufacturing enables rapid prototyping and efficient production scaling. Whether it's unique fiber counts, hole dimensions, fiber pitches, or tailored configurations, T&S responds quickly to customization needs—delivering reliable ferrules that meet both customer expectations and stringent industry standards.

### Typical Customizations

- Rear-end No-step Ferrule
- Short Length Ferrule
- Front-end Chamfered Ferrule
- Narrow Width Ferrule



### Application

MPO fiber optic connector, Micro-optical connection products.

## MPO Connector Kits

### Connector Types



For 2.0/3.0mm Round Cable



For 3.6mm Round Cable



For 5.0mm Round Cable



For Ribbon Cable



For Ribbon Fiber



With Mini Boot



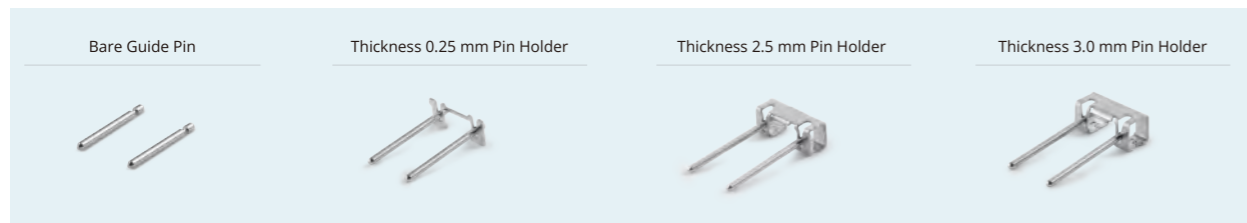
With Push-pull Boot



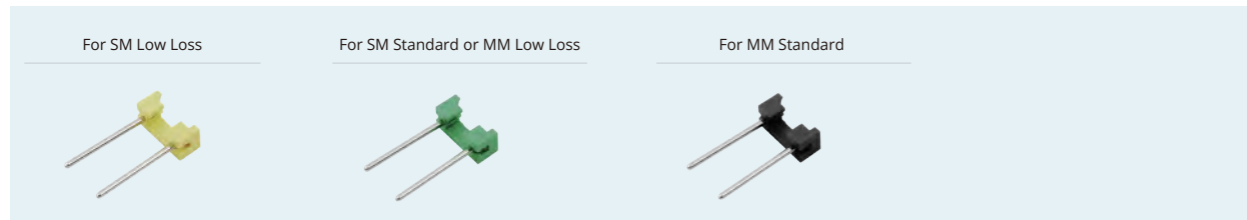
With Flex-angle Boot (From Straight to 90°)

### Guide Pin

#### Metal Holder Series



#### Plastic Holder Series



#### Metal Holder Series

Guide Pin	Pin Diameter (mm)	Guide Pin	Pin Diameter (mm)
12F/24F/36F SM Low Loss	0.6985±0.0001	16F SM Low Loss	0.5487±0.0001
12F/24F/36F SM Standard	0.6985±0.0005	16F SM Standard	0.5485±0.0005
12F/24F/36F MM Low Loss	0.6985±0.0005	16F MM Low Loss	0.5485±0.0005
12F/24F/36F MM Standard	0.698±0.001	16F MM Standard	0.548±0.001

# Fiber Optic Interconnection

## Your Partner in Precision and High-Density Connectivity

With over 20 years of experience, T&S has established itself as a global leader in fiber-optic connectivity, supplying high-performance MPO and other fiber connectors to hyperscale and large-scale data centers worldwide. As the company's largest business segment, our cable assemblies reflect unparalleled expertise and extensive product breadth. Combined with state-of-the-art facilities, equipment, and well-established process and quality management know-how, they deliver a level of precision and reliability rarely matched in the industry.

## Patch Cord & Pigtail

Patch cords and pigtails play a crucial role in establishing seamless connectivity across modern networks. Factory-terminated and machine-polished, they are engineered with precision and backed by our well-established manufacturing expertise, delivering consistent, reliable performance. Available with both Multimode and Singlemode contacts, these cords are suitable for a wide range of network applications, from enterprise systems to hyperscale data centers.



### Applications

**Data Centers:**  
Critical for high-speed data transmission.

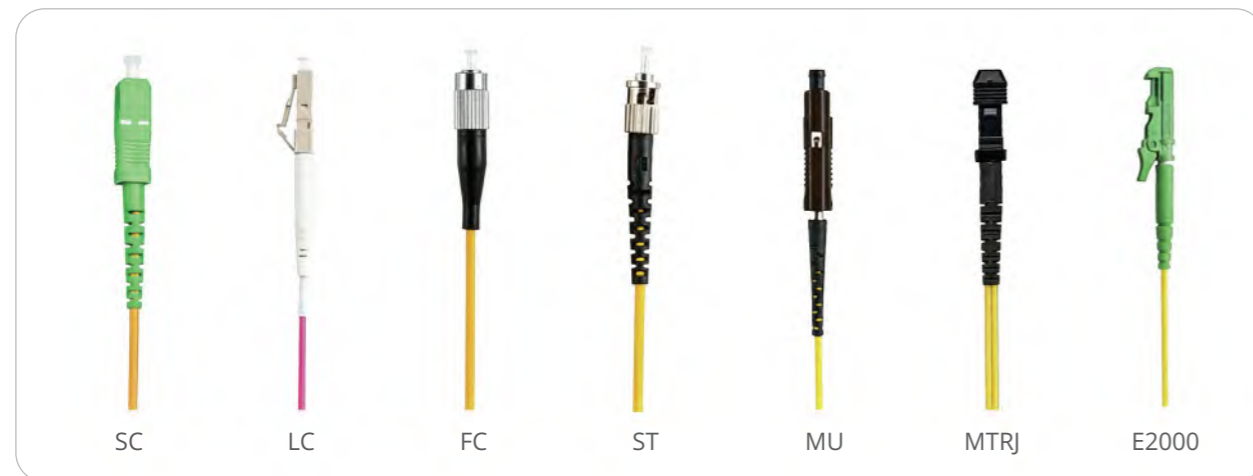
**Telecommunication Networks:**  
Ensures reliable signal integrity.

**Enterprise Environments:**  
Connects servers, switches, and routers.



### Standards and Compliance

TIA/EIA 604 Series  
TIA/EIA 568.3-D  
IEC 61754 Series  
IEC 61753-1  
GR 326-Core



## Patch Cord & Pigtail

### General Specification

Constructions	Descriptions				
Fiber Mode	Single mode: G.652/G.657				
	Multimode: OM1/OM2/OM3/OM4/OM5				
Cable Jacket Material	LSZH, PVC, PE				
Cable Jacket Ratings	Riser (OFNR), Plenum (OFNP)				
Cable Jacket Color	G.652/G.657	OM1/OM2	OM3	OM4	Customized
	Yellow	Orange	Aqua	Aqua/Magenta	
Polarity	A-A, A-B (TIA 568.3-D)				
Connector Type	FC/SC/LC/MU/ST/MTRJ/SMA etc.				
Endface Polish	PC/UPC/APC				
Operating Temperature	-10 °C to +60 °C				
Storage Temperature	-40 °C to +85 °C				

### Technical Specification

Optical Properties		Single-mode			Multimode
		PC	UPC	APC	PC ≤ 0.2
Insertion Loss	dB	≤ 0.3	≤ 0.2	≤ 0.3	PC ≤ 0.2
Return Loss	dB	≥ 45	≥ 50	≥ 65	PC ≥ 20
Wavelength	nm	1310/1550			850/1300
Durability		≤0.3(dB) Typical change, 500 matings			

**Notes:**  
IL Test method: IEC 61300-3-4 insertion method B.

### Geometric Parameters of Endface

			PC	APC
Radius of Curvature	2.5mm ferrule	mm	10~25	5~12
	1.25mm ferrule	mm	7~25	5~12
Apex Offset		µm	≤50	≤50
Fiber Spherical Height		nm	-125(Concave), +100(Convex)	-125(Concave), +100(Convex)
Angle		°	0±0.3	8±0.3

## Multifiber Cable Assembly

T&S Pre-terminated Cable Assemblies deliver reliable, ready-to-deploy connectivity, eliminating time-consuming field termination. Featuring multiple connectors (LC, SC, FC, ST, MT-RJ, and E2000) and indoor, outdoor, or ribbon cables, they support simplex and duplex configurations. Ideal for data centers, FTTx networks, and enterprise backbones, these assemblies are fully RoHS compliant.



### Superior Performance

Precision-tested to surpass industry standards for insertion loss and return loss, ensuring reliable signal integrity.

### Proven Reliability

Backed by T&S's 25 years of expertise, delivering robust assemblies built for demanding applications in data centers, building backbones, and rack systems.

### Optical Performance

Optical Properties	Single-mode	Multimode
Insertion Loss (dB)	UPC $\leq$ 0.2; APC $\leq$ 0.3	PC $\leq$ 0.2
Return Loss (dB)	UPC $\geq$ 50; APC $\geq$ 65	PC $\geq$ 20
Wavelength (nm)	1310/1550	850/1300
Durability	$\leq$ 0.3(dB) Typical change, 500 matings	

**Notes:**  
IL Test method: IEC 61300-3-4 insertion method B.

## VSFF Interconnects

### MDC · CS · SN

VSFF-based fiber optic patch cords designed for high-density front-panel cabling in data center environments. They support 400G/800G pluggable optics and enable efficient routing, easy installation, and reliable maintenance in space-constrained racks.

T&S is Licensed Manufacturer of US CONEC MDC Connectors and Adapters.



CS Patchcord

SN Patchcord

MDC Patchcord

## Next-Gen Multi-Fiber Interconnects

### MMC · SN-MT · MXC

High-density fiber optic connectivity solutions optimized for parallel transmission and in-system cabling. Designed for ultra-high fiber counts and short-reach links, they support advanced architectures in AI, HPC, and next-generation switching systems.

T&S is officially certified by US Conec for MMC connector and TMT ferrule termination and assembly in compliance with TN-1000 (MMC-CERT v1.0).



MMC Patchcord

SN-MT Patchcord

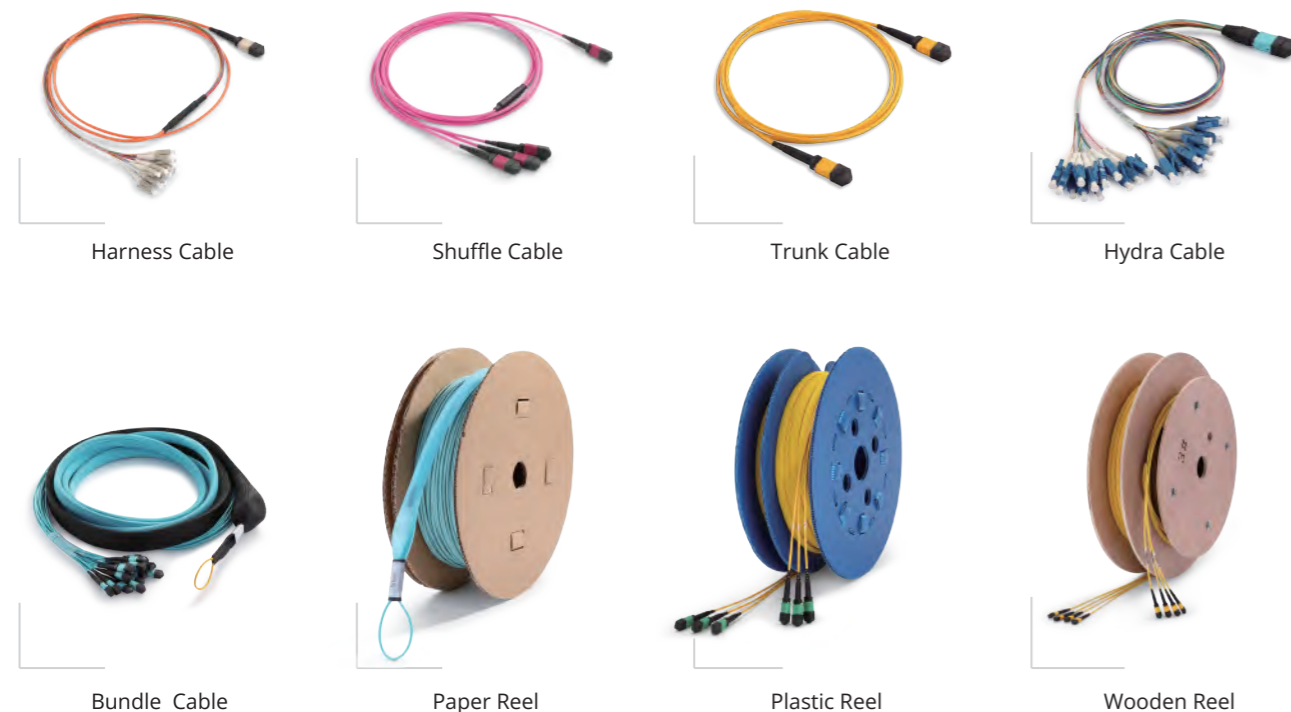
MXC Patchcord

## MPO/MTP Cable Assemblies



T&S MPO/MTP® Cable Assemblies are engineered for high-speed, reliable connectivity in high-density environments. Backed by over 25 years of experience, T&S is one of the world's largest fiber optic connector manufacturers, supplying MPO/MTP® solutions at scale to leading data centers worldwide.

We offer a complete portfolio of MPO/MTP® cable assemblies—including trunk, shuffle, harness, and hydra cables, as well as module cassettes and patch systems—enabling scalable, efficient network deployment for data-intensive and compute-driven infrastructures, from modern data centers to high-performance and AI computing platforms.



## MPO/MTP Cable Assemblies

### General Information

Item	Descriptions
Fiber Count	4-384 Fibers
Fiber Mode	Single-mode: G.652/G.657
	Multimode: OM1, OM2, OM3, OM4
Cable Jacket Material	LSZH, PVC, PE
Cable Jacket Ratings	Riser (OFNR), Plenum (OFNP)
Polarity	Type A, Type B, Type C (TIA-568.3-D)
MT Ferrule	12F/16F/24F/32F/48F
Gender	Male/Female
Connector Brand	US Conec MTP®, Senko MPO, Nissin MPO, Sanwa MPO, FURUKAWA MPO, TASLO MPO
Pulling Eye	Customizable
Operating Temperature	-10 °C to +60 °C
Storage Temperature	-40 °C to +85 °C

### Fiber Optic Performance

MPO/MTP Connector	Unit	Standard SM MT Ferrule	Low Loss (Elite) SM MT Ferrule	Standard MM MT Ferrule	Low Loss MM MT Ferrule
Insertion Loss	Typical	dB	0.35	0.20	0.35
	Maximum	dB	0.75	0.35	0.60
Return Loss	dB	≥60 for APC (8° Polish)		≥20 for PC	

### Geometric Parameter of Endface

Item	Unit	SM	MM
RX	mm	≥2000 / ≤10000	≥2000 / ≤10000
RY	mm	Min 5	Min 5
Fiber Height	nm	1000 ~ 3500	1000 ~ 3500
Max.Diff.Height All	nm	MAX: 500	MAX: 500
Max.Diff.Height Adj.	nm	MAX: 300	MAX: 300
X Axis Angle	°	-0.15 ~ 0.15	-0.15 ~ 0.15
Y Axis Angle	°	APC: 7.80 ~ 8.20	-0.20 ~ 0.20
Core Dip	nm	N/A	-100 ~ 200

## IEC Graded Patch Cord



T&S provides fiber optic patch cords sorted into performance grades based on IEC 61300-3-34 random mating test results.

Grade	Random Mating (IEC61300-3-34)
Grade B	IL $\leq 0.12$ dB (mean) IL Max 0.25dB for 97% samples
Grade C	IL $\leq 0.25$ dB (mean) IL Max 0.50dB for 97% samples
Grade D	IL $\leq 0.50$ dB (mean) IL Max 1.00dB for 97% samples

## Reference Cord- Standard Connectors



Parameters	Unit	Single-mode(APC)	Single-mode(UPC)	Multimode
ROC	mm	6~11 (APC)	7~20(1.25 mm) 10~25(2.5 mm)	7~20(1.25 mm) 10~25(2.5 mm)
Apex Offset	$\mu$ m	0~30	0~30	0~30
Fiber Height	nm	$\pm 50$	$\pm 50$	$\pm 50$
Angle	$^{\circ}$	$8 \pm 0.3$	$0 \pm 0.2$	$0 \pm 0.2$
Core dip	nm	NA	NA	$\pm 50$

Optical Properties	Unit	Single-mode	Multimode
Insertion Loss	dB	Low loss $\leq 0.10$	Low loss $\leq 0.10$
Return Loss	dB	UPC $\geq 55$ ; APC $\geq 65$	UPC $\geq 35$ dB
Durability	-	$\leq 0.2$ dB typical change, 500 matings	-
Wavelength	nm	1310/1550	850/1300

Notes:  
IL&RI Test method:IEC 61300-3 4 insertion method B.

## Reference Cord- MPO/MTP Connectors



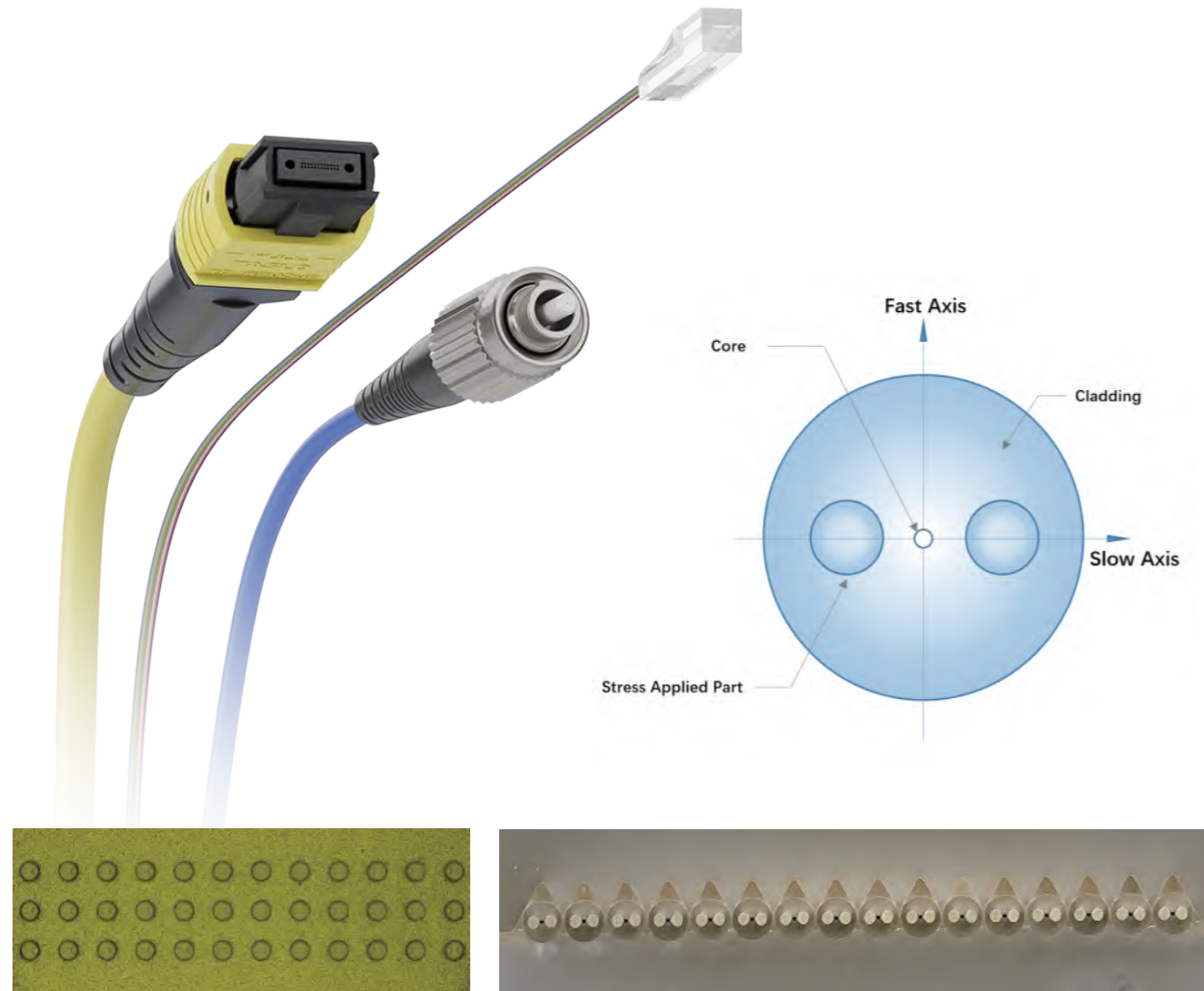
Parameters	Unit	Single-mode	Multimode
X Axis Angle	$^{\circ}$	$\pm 0.10$	$\pm 0.15$
Y Axis Angle	$^{\circ}$	7.85~8.15 (APC) ; $0 \pm 0.15$ (PC)	
RX	mm	$\geq 2000 / \leq 10000$	
RY	mm	$> 60$	
Fiber Curvature Radius	mm	$> 1$	
Fiber Height	nm	1000 ~2500	
Max.Diff.Height All	nm	Max: $< 400$	
Max.Diff.Height Adj.	nm	Max: $< 200$	
Coplanarity	nm	$\leq 200$ (single-row fiber); $\leq 100$ (double-row fiber)	
Core Dip	nm	N/A	$-50 \sim +100$

Optical Properties	Unit	Single-mode	Multimode
Insertion Loss	dB	Low loss $\leq 0.35$ ; Super low loss $\leq 0.25$	Low loss $\leq 0.35$
Return Loss	dB	PC $\geq 50$ ; APC $\geq 60$	PC $\geq 25$ ; APC $\geq 40$
Durability	-	$\leq 0.2$ dB typical change, 50 matings	-
Wavelength	nm	1310/1550	850/1300

Notes:  
IL&RI Test method:IEC 61300-3 4 insertion method B.

## Panda PM Fiber Patchcord

T&S manufactures Polarization-Maintaining (PM) fiber optic patch cords and FAUs with consistently high extinction ratios (ER). Available with FC, SC, LC, MPO, and E2000 connectors, including AR-coated variants, all assemblies are produced and individually tested in-house to ensure low insertion loss and return loss exceeding 50 dB (UPC) and 60 dB (APC).



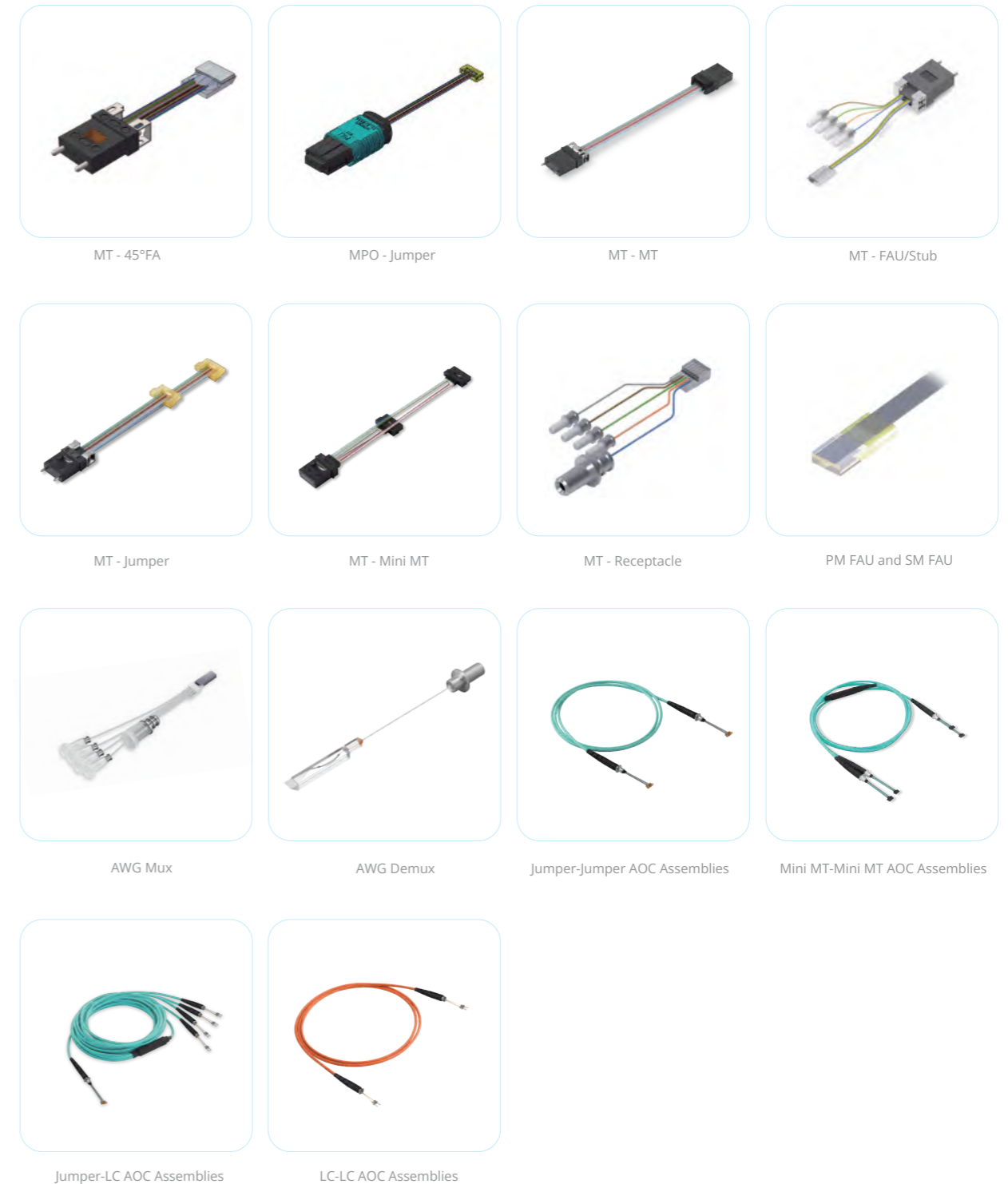
### Technical Specification

Optical Properties	Unit	Multi-fiber Connector	Single Fiber Connector
Insertion Loss	dB	Low loss ≤ 0.35 Standard loss ≤ 0.75	UPC ≤ 0.2 APC ≤ 0.3
Return Loss	dB	UPC ≥ 50; APC ≥ 60	UPC ≥ 50; APC ≥ 60
Extinction Ratio	dB	≥ 23	≥ 23
Wavelength	nm	PM850: 850 PM980: 980 PM1310: 1310 PM1550: 1550	

**Notes:**  
IL Test method: IEC 61300-3-4 insertion method B.

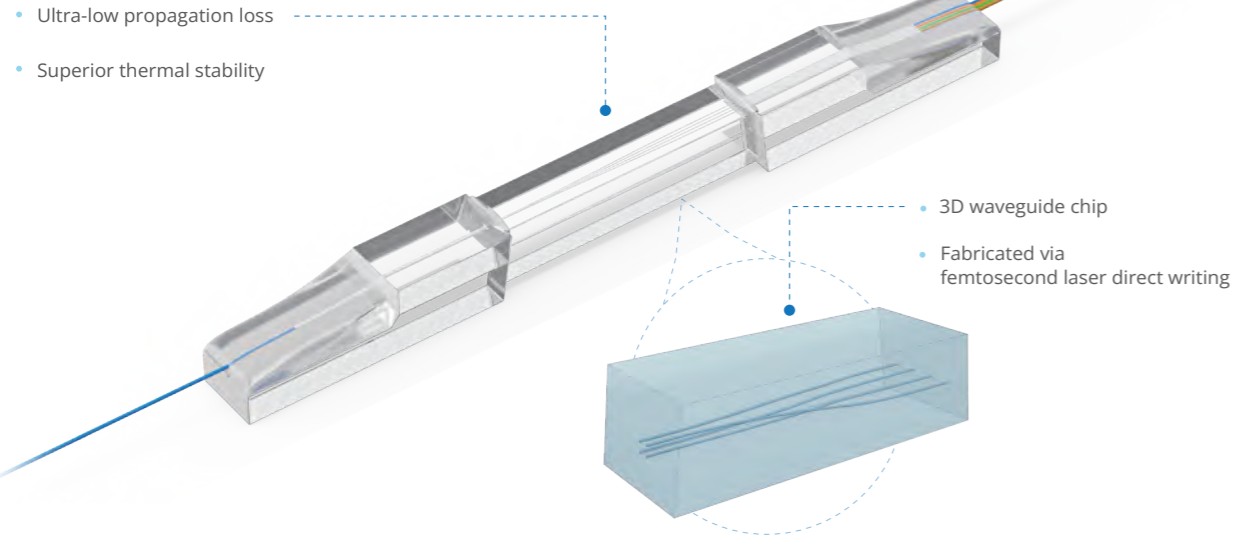
## Micro-Optical Connection Product Solutions

T&S Micro-Optical Connection Product Solutions focus on high-density, low-power optical connectivity at the chip and module level, enabling compact, scalable, and efficient integration for advanced photonic systems.

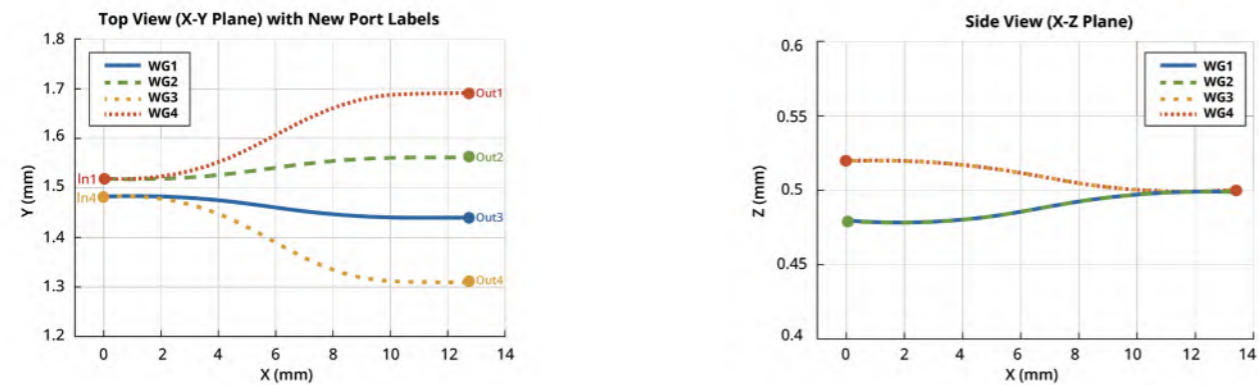


## Multi-core Fiber Fan-in/Fan-out Device

Built on femtosecond laser-written 3D waveguide chips, the Multi-core Fiber Fan-in/Fan-out (MCF FIFO) device enables precise spatial mapping and routing beyond planar optical constraints. Designed for high-density optical interconnects, the device supports low-loss coupling between multicore and single-core fibers, delivering excellent thermal stability and long-term reliability for advanced optical interconnect applications.



### Waveguide Illustration



### Technical Specification

Items	Unit	Values
Average Insertion Loss @1310nm	dB	≤0.8
Return Loss	dB	>50
Crosstalk (Adjacent Cores)	dB	<-40
Polarization Dependent Loss (PDL)	dB	0.1
Packaging Box Size	mm	50×5×4 (Customized)
Operating Temperature	°C	-10 to +85

## AR Coated Cable Assemblies

Cable assemblies with AR-coated connectors improve mating durability, reduce dust sensitivity, and lower spring-force requirements. The AR coating maintains stable optical performance with low insertion loss and high return loss, delivering reliable, long-lasting connectivity for high-density, demanding network applications.

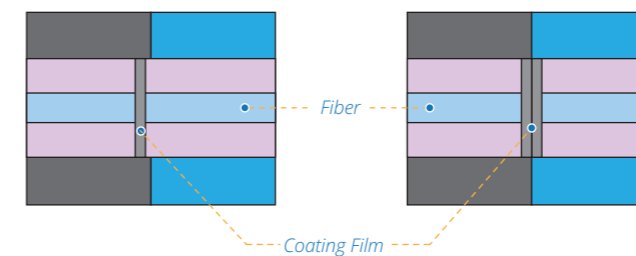
### Insertion Loss

≤0.35dB

### Mating Durability

>800 Times

### Non-Contact Mating



### Key Features

- Insensitive to dust;
- No damage to endface;
- Compatible with both coated and non-coated patchcords. (Performance depends on transmission direction when mated with non-coated patchcords.)

### Technical Specification

Items	Unit	Performance
Insertion Loss	dB	≤0.35 (Low Loss)
Return Loss	dB	APC≥65
Mechanical Durability	-	≤0.2 (Typical Change), ≥800 times (Mating)
Wavelength	nm	SM: 1310/1550
Operation Temperature	°C	-10 to +60
Storage Temperature	°C	-40 to +85

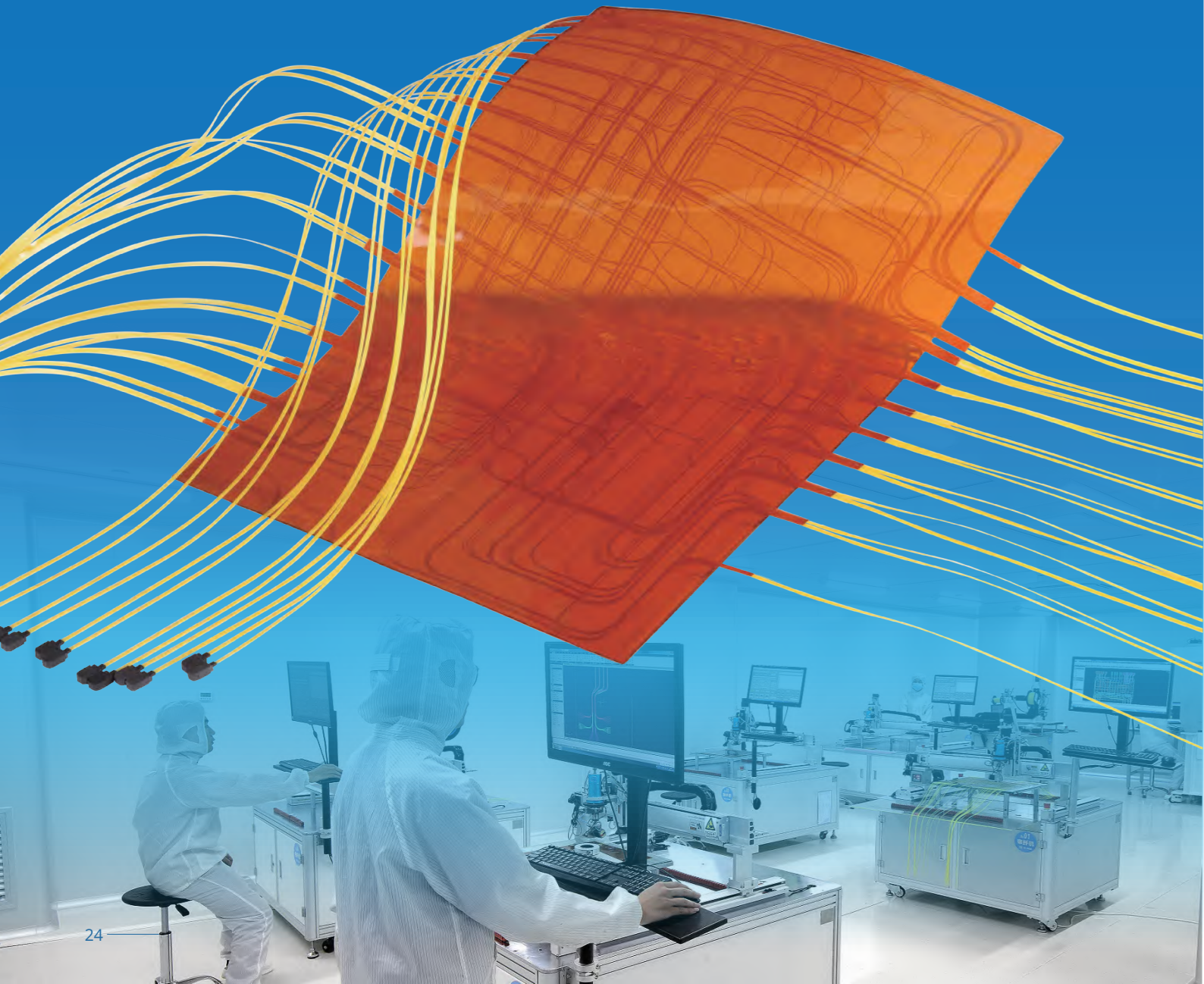
# Fiber Optic Flex Circuits (FOFCs)

## High-Density Fiber Routing and Shuffling for Compact Systems

FOFC (Fiber Optic Flex Circuits) are engineered fiber routing assemblies in which multiple optical fibers are precisely fixed into predefined pathways using specialized coatings and rugged substrates.

Designed for next-generation high-density interconnect architectures, FOFC replaces manual patch cord routing with a structured, predictable optical routing solution for data center fabrics, CPO systems, and HPC environments.

- Lightweight & Slim
- Highly Customizable
- Ultra-High-Density
- Rugged and Reliable
- Flexible & Rollable
- Modular & System-ready



## Fiber Optic Flex Circuit

### General Information

Items	Unit	Performance
Fiber Type	-	Single-mode / Multimode
Fiber OD	µm	160-300
Thickness	mm	≤1.0
Dimension	mm	Up to 800 × 1000
Fiber Positioning Accuracy	mm	±0.01
Storage Temperature	°C	-40 to +85
Operating Temperature	°C	-40 to +85
Flammability Rating	-	UL 94 V-0
Insertion Loss	dB	<0.1 (excluding connector loss)

### Automatic Fiber Route Design

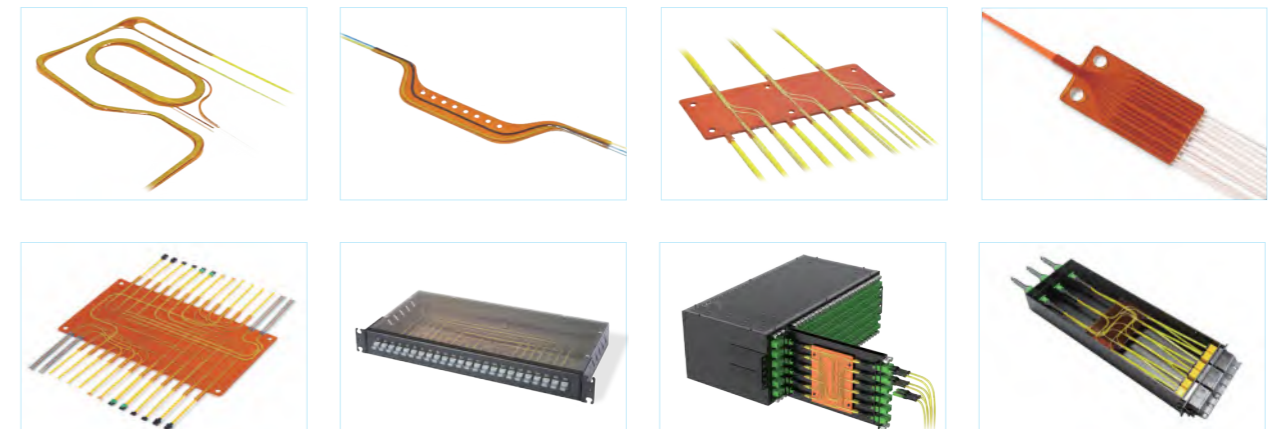
#### T&S Patented CAD Tool Suite for Fiber Route Design

T&S Patented CAD Tool Suite for Fiber Route Design rapidly generates optimized fiber layouts and performs routing simulations based on user-defined optical routing relationships—often within seconds. It provides actionable feedback to minimize signal loss and maintain high reliability in high-density configurations.

### Automatic Production

Our in-house automated fiber placement system, continuously upgraded, enables precise and efficient optical fiber routing. Fully integrated with automated substrate cutting and adhesive spray-curing, the production line ensures consistent quality and high yield, forming the core capability of T&S's high-performance FOFC manufacturing.

### More Products



# Outdoor and Harsh Environment Fiber Optic Cable Assemblies

Reliable fiber optic cable assemblies for demanding outdoor environments, including waterproof cables, IP68-rated patch cords, base station remote patch cords, and FTTH drop cable patch cords for telecom and access networks.

## Applications

- FTTA feeders for all standard RRH models and systems
- 5G, 6G Base Station
- Horizontal and Vertical Cabling
- Industrial outdoor applications

## Cable Assemblies for Harsh Environments



### Outdoor Waterproof Patch Cord

**Customizable Fiber Configurations:**  
Supports 4, 8, 12, or 24 fiber versions.

**Durable and Versatile:**  
Compact, sealed, circular IP68-rated connector designed for FTTA, CATV, RRH, and harsh environments.



### Outdoor IP68 Patch Cord

**Multiple Connector Options:**  
LC duplex, SC simplex, and MPO/MTP available.

**Customizable Fiber Configurations:**  
4, 8, 12, and 24 fibers supported.

**Durable and Versatile:**  
Sealed circular interface for reliable performance in harsh environments.



### Outdoor Base Station Remote Patch Cord

**Weatherproof Design**  
UV-resistant sheath and rugged connectors for long-term outdoor use.

**Enhanced Mechanical Strength**  
Reinforced structure ensures high tensile and crush resistance.

**Wide Compatibility**  
Supports standard base station interfaces and LC, SC, MPO connectors.

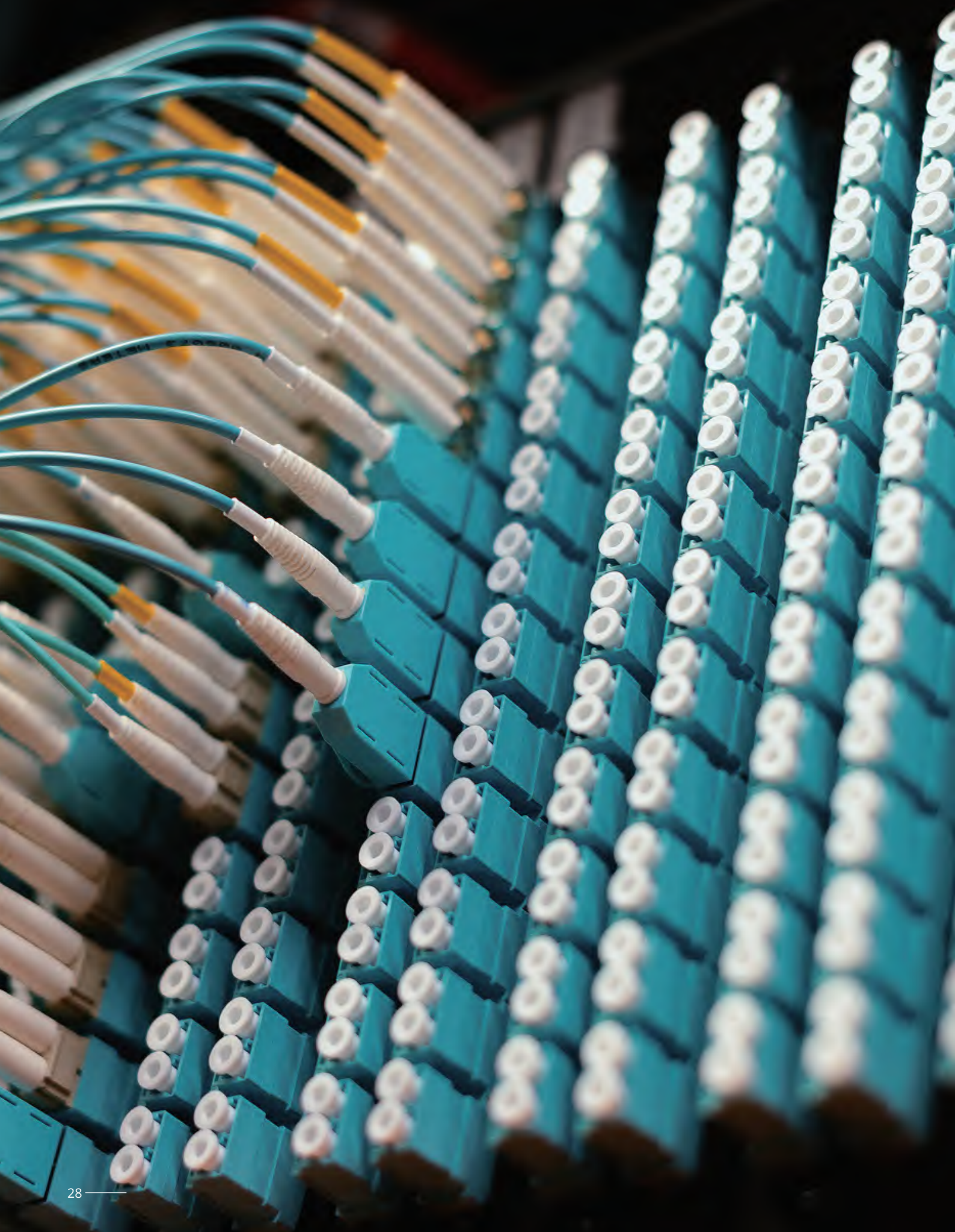


### FTTH Drop Cable Patch Cord

**Compact and Flexible Design**  
Optimized for last-mile access and tight installation spaces.

**Pre-Terminated for Easy Deployment**  
Factory-terminated connectors ensure fast and reliable installation.

**Reliable Outdoor Performance**  
Durable drop cable construction suitable for access networks and residential environments.



## Other Connection Components

### Connectors



Various types available  
Low insertion loss  
RoHS compliant

### Adapters



Low Insertion Loss  
Comply with IEC and TIA standards  
Excellent repeatability  
Good durability

### Fiber Optic Terminators



Precision-Engineered to IEC 61754-XX  
Complete bandwidth from 1260nm to 1640nm  
RoHS Compliant

### Fixed Plug-in/In-line Attenuators



In accordance with Bellcore ( GR-910-Core ) standard  
Attenuation fiber  
Easy connection  
Precise attenuation and high return loss

## LC Adapters with Internal Shutter

The T&S self-developed LC Shutter Adapter offers a robust and hands-free solution to protect fiber interfaces from dust and harmful light. Its internal automatic shutter eliminates manual dust caps, keeping unused ports clean and reducing maintenance. With high-precision zirconia ceramic sleeves for stable performance and full Singlemode/Multimode compatibility, it is a dependable protection component for any fiber optic network.



### Features

- IP5X dust proof
- 100% automatic shutter action
- Laser safety
- Easy and quick installation
- Shutter operates without contacting the ferrule endface
- Patented in China

### LC Shutter Adapter Family

Adapter				
Structure	Symmetric	Asymmetric	Asymmetric	Symmetric
Type	Simplex	Duplex Stepped	Duplex Stepped	Duplex SC Footprint
Housing Material	Plastic	Metal + Plastic	Plastic	Plastic
Flange	/	Flangeless	Flangeless	Short Flange
Patented	Yes	Yes	Yes	Yes
Adapter				
Structure	Symmetric	Symmetric	Symmetric	
Type	Duplex SC Footprint	Quad	Quad	
Housing Material	Plastic	Plastic	Plastic	
Flange	With Flange	Short Flange	With Flange	
Patented	Yes	Yes	Yes	
Durability	500 cycles			
Sleeve Material	Ceramic			
Internal Shutter	Yes			
Housing Colors	Blue, Green, Aqua, Magenta			
Installation	Snap mount or Screw-mount			

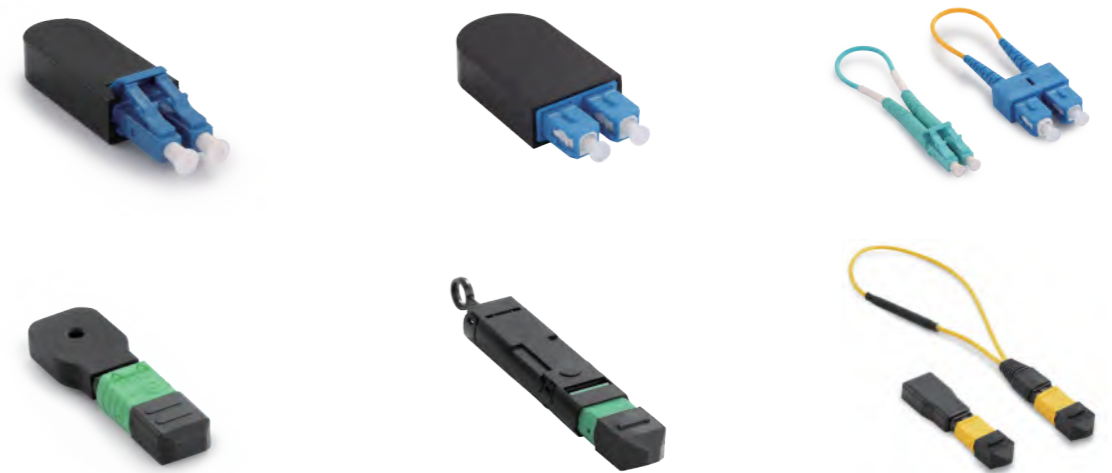
## LC Adapters with Internal Shutter

### Performance

Item	Unit	Value
Typical Insertion Loss	dB	0.10
Max. Insertion Loss	dB	0.20
Operating Temperature	°C	-40 to +75
Operating Humidity	%	≤ 95

## Fiber Optic Loopback

Loopbacks are essential for fiber optic testing and network restoration. By reflecting optical signals back to the source, they enable quick verification of transmit and receive functionality. Compact and durable, they are widely used in data centers, telecom networks, and optical module testing. This efficient tool streamlines troubleshooting and enhances network reliability.

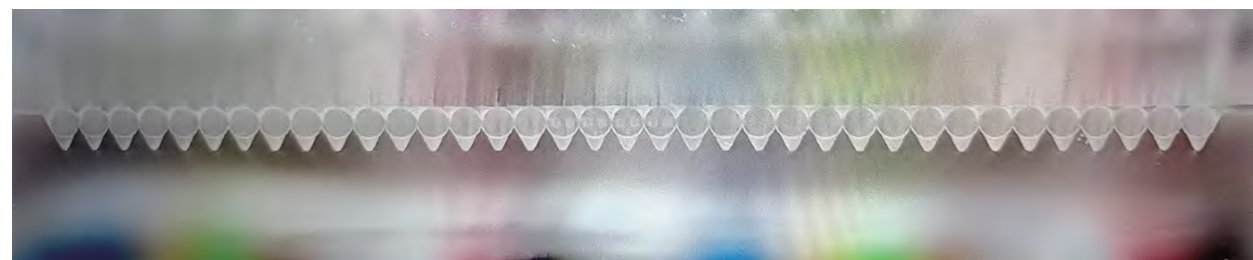
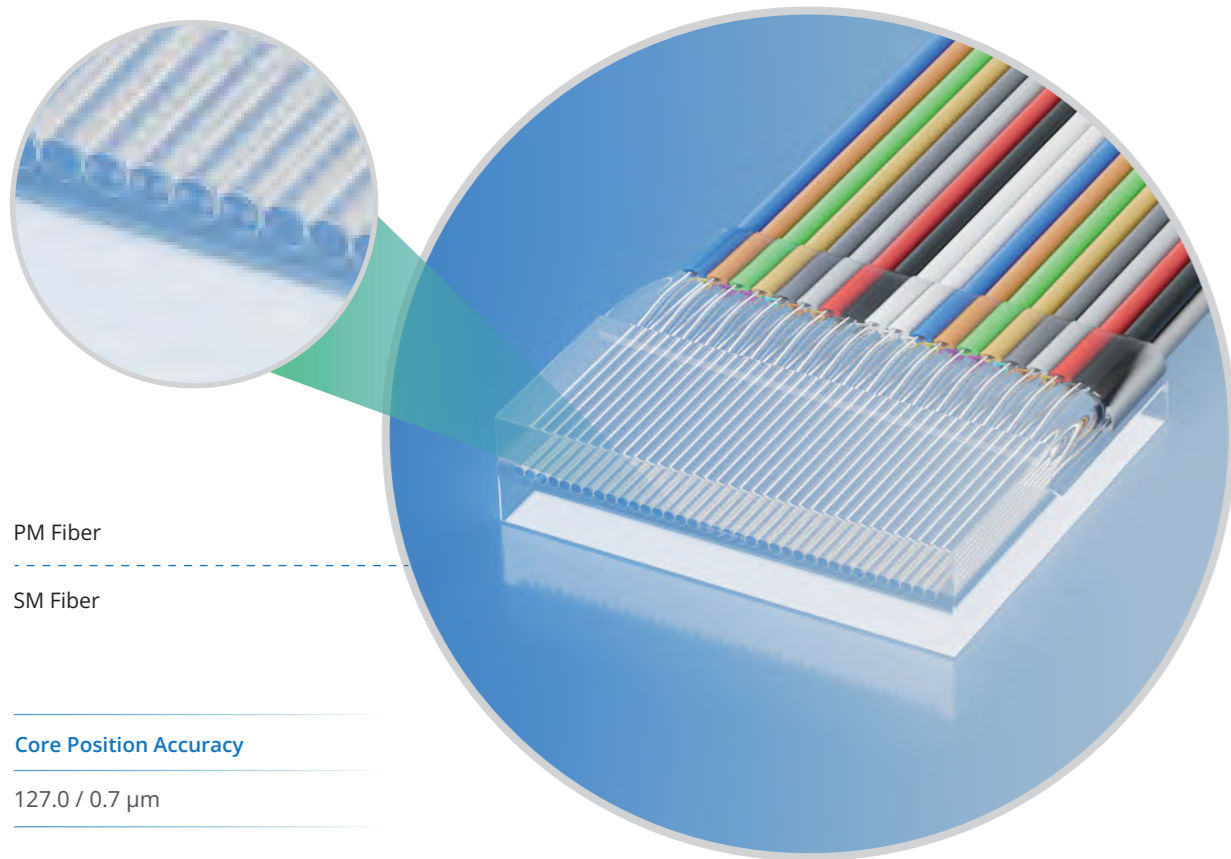


Optical Properties	Unit	Single-mode	Multimode
Insertion Loss (SC, LC etc.)	dB	APC ≤ 0.60 (Typical: ≤ 0.30)	APC ≤ 0.60 (Typical: ≤ 0.30)
		UPC ≤ 0.40 (Typical: ≤ 0.20)	PC ≤ 0.40 (Typical: ≤ 0.20)
Insertion Loss (MTP®/MPO)	dB	Low Loss ≤ 0.70 (Typical: ≤ 0.50)	Low Loss ≤ 0.70 (Typical: ≤ 0.50)
		Standard Loss ≤ 1.50 (Typical: ≤ 0.80)	Standard Loss ≤ 1.20 (Typical: ≤ 0.60)
Return Loss	dB	PC ≥ 50; APC ≥ 60	PC ≥ 20; APC ≥ 40
Durability	-	≤ 0.2 dB Typical change, 50 matings	
Wavelength	nm	Single-mode: 1310/1550, Multimode: 850/1300	

**Notes:**  
IL&RL Test method: IEC 61300-3-4 insertion method D.

## Fiber Array Unit (FAU)

T&S FAUs utilize high-precision fiber positioning technology to integrate multiple fibers into a compact array, enabling accurate optical coupling and stable performance. They support customized fiber spacing as well as various fiber types, offering low insertion loss, high alignment accuracy, and excellent reliability. FAUs are widely used in optical modules, silicon photonics, WDM systems, and high-density optical interconnection applications.



### Specification

<b>Insertion Loss</b>	<b>Return Loss</b>	<b>PER</b>
≤0.2dB	≥20dB	≥25dB
<b>PM Slow Axis Alignment</b>	<b>Polish Flatness</b>	<b>Operating Temperature</b>
0±3°	≤1.6μm	-40 °C ~ +85 °C

**Notes:**  
Take 36F (4 PM fiber+32 SM Fiber) FAU as an example.



## Ultra Series HD 19" Enclosure

T&S 19" Fiber Optic Patch Enclosures deliver unmatched flexibility and density for modern data center and FTTx deployments. Built around a unified modular family, the series supports MPO, MDC, SN, LC, and SC adapter panels/module cassettes in simplex, duplex, triple, or quad configurations. Module cassettes double as adapter panels when de-housed, enabling seamless reconfiguration without replacing the enclosure. Metal and plastic versions require matching module cassettes/adapter panels, yet a simple swap of a single removable component converts the enclosure between material versions, providing an economical and flexible solution.

### Features

- Durable and lightweight aluminum construction
- Textured black powder coat finish
- Universal 19" rack compatibility
- Modular Design, Flexible Configuration, Seamless Upgrades

### UltraN HD 19" 1U Enclosure, Sliding Type



Items	Details
Height	1U
Loading	Four Cassettes / Adapter Panels
Patching Capacity	256F (SN or MDC)
Installation	Rack-mount
Material	Metal
Dimension	483×44×387.2 (mm)
Weight	2.7 kg
Family/Series	Ultra/N

### UltraX HD 19" 1U Enclosure, Fixed Type



Items	Details
Height	1U
Loading	Four Cassettes / Adapter Panels
Patching Capacity	256F (SN or MDC)
Installation	Rack-mount
Material	Metal
Dimension	483×44×283.5 (mm)
Weight	2.8 kg
Family/Series	Ultra/X

## Ultra Series HD 19" Enclosure

### UltraY HD 19" 1U Enclosure, Sliding Type



Items	Details
Height	1U
Loading	Four Cassettes / Adapter Panels
Patching Capacity	256F (SN or MDC)
Installation	Rack-mount
Material	Metal
Dimension	483×44×448.5 (mm)
Weight	5.6 kg
Family/Series	Ultra/Y

### UltraS HD 19" 1U Enclosure, Lite Type



Items	Details
Height	1U
Loading	Four Cassettes / Adapter Panels
Patching Capacity	256F (SN or MDC)
Installation	Rack-mount
Material	Metal
Dimension	483×44×270 (mm)
Weight	1.5 kg
Family/Series	Ultra/S

### UltraM HD 19" 4U Enclosure, Sliding Type



Items	Details
Height	4U
Loading	12 Cassettes / Adapter Panels
Patching Capacity	256F (SN or MDC)
Installation	Rack-mount
Material	Metal
Dimension	482×178×467.7 (mm)
Weight	8.6 kg
Family/Series	Ultra/M

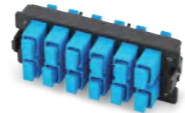
### Ultra Series · Adapter Panel & Module Cassette



Channel	144F (MPO-24)
Port	MPO/MTP®
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	288F (MPO-24)
Port	MPO/MTP®
Material	Plastic
Match	Ultra N/Y/X/S/M



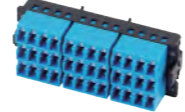
Channel	12F
Port	SC Simplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	12F
Port	LC Duplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	24F
Port	LC Duplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	36F
Port	LC Duplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	64F
Port	MDC (Quad)
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	144F (MPO-24)
Port	MPO/MTP®
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	288F (MPO-24)
Port	MPO/MTP®
Material	Metal
Match	Ultra N/Y/X/S/M



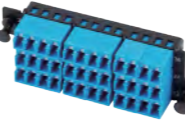
Channel	12F
Port	SC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	12F
Port	LC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	24F
Port	LC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	36F
Port	LC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	48F
Port	MDC (Triple)
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	64F
Port	MDC (Quad)
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	64F
Port	SN (Quad)
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	-
Port	-
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	144F (MPO-24)
Port	MPO/MTP®
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	288F (MPO-24)
Port	MPO/MTP®
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	12F
Port	SC Simplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	12F
Port	LC Duplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	24F
Port	LC Duplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	36F
Port	LC Duplex
Material	Plastic
Match	Ultra N/Y/X/S/M



Channel	64F
Port	MDC (Quad)
Material	Plastic
Match	Ultra N/Y/X/S/M

## Ultra Series · Adapter Panel & Module Cassette



Channel	144F (MPO-24)
Port	MPO/MTP®
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	288F (MPO-24)
Port	MPO/MTP®
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	12F
Port	SC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	12F
Port	LC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	24F
Port	LC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	36F
Port	LC Duplex
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	48F
Port	MDC (Triple)
Material	Metal
Match	Ultra N/Y/X/S/M



Channel	64F
Port	MDC (Quad)
Material	Metal
Match	Ultra N/Y/X/S/M



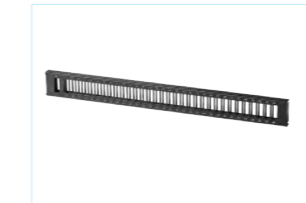
Channel	64F
Port	SN (Quad)
Material	Metal
Match	Ultra N/Y/X/S/M

## PS Series · PLC Splitter Patch Enclosure

### PSB\_Front Panel Type



Items		Details
Height		1U
Loading		Integrated Adapter Panel
Installation		Rack-mount
Material	Body	Aluminum
	Front Rack	Cold-roll Sheet
	Adapter Panel	Cold-roll Sheet
Dimension (HWD)		44×483×200 (mm)
Weight		1.5 kg



2x64 (SC Duplex)



1x32 (SC Simplex)



2x32 (LC Duplex)



2x64 (LC Duplex)

### PSP\_Module Cassette Type



Items		Details
Height		1U
Loading		Module Cassettes
Installation		Rack-mount
Material	Body	Aluminum
	Front Rack	Cold-roll Sheet
	Adapter Panel	Cold-roll Sheet
Dimension (HWD)		44×483×200 (mm)
Weight		1.5 kg



1x4 PLC LGX Box (SC)



1x8 PLC LGX Box (SC)



2x8 PLC LGX Box (LC Duplex)



2x16 PLC LGX Box (LC Duplex)

# PLC Wafer & Chip

Planar Lightwave Circuit (PLC) Splitter Wafer & Chip

Arrayed Waveguide Grating (AWG) Wafer & Chip

All AWG and PLC chips are manufactured by our wholly owned subsidiary **AuspChip**, one of the very few producers in mainland China capable of large-scale planar lightwave circuit (PLC) chip production.

We support flexible design and customization to meet diverse optical network requirements.

**6 INCHES  
WAFER**

## PLC Splitter Chip

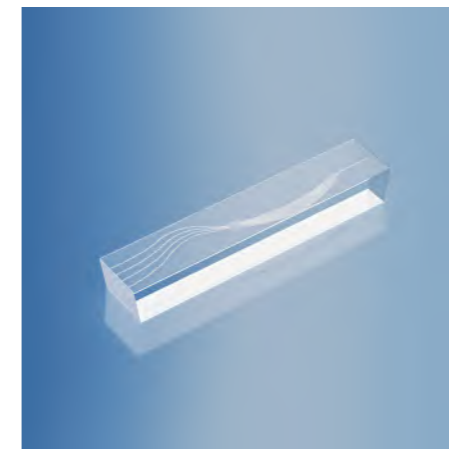


Parameter	Unit	1X2	1X4	1X8	1X16	1X32	1X64	8X(1x2)
Insertion Loss	dB	3.5	6.7	9.8	13.0	16.2	19.8	3.6
PDL	dB	0.15	0.15	0.2	0.25	0.25	0.3	0.15
Uniformity	dB	0.5	0.5	0.6	0.8	1.0	1.5	0.5
Parameter	Unit	2X2	2X4	2X8	2x16	2X32	2X64	
Insertion Loss	dB	3.9	7.0	10.0	13.6	16.7	20.7	
PDL	dB	0.15	0.2	0.2	0.25	0.3	0.3	
Uniformity	dB	0.6	0.8	1.0	1.5	1.8	2.0	
Operating Wavelength	nm	1260-1650						
Return Loss	dB	≥55						
Directivity	dB	≥55						
Operating Temperature	°C	-40 to +85						
Storage Temperature	°C	-40 to +85						
Max. Input Power	mW	500						

**Notes:**

1. All parameters are measured at 1310 nm and 1550 nm.
2. IL values shown are based on P-grade products.

## PLC AWG Chip



Parameter	CWDM4-250µm Pitch Demux	CWDM4-500µm Pitch Demux	CWDM4-750µm Pitch Demux	Unit
Channel Spacing	20	20	20	nm
Center Wavelength	1271/1291/1311/1331			nm
CWL Accuracy (@25°C)	±1	±1	±1	nm
Insertion Loss	2.0	2.0	2.0	dB
Uniformity	1.0	1.0	1.0	dB
Ripple	1.0	1.0	1.0	dB
1dB Bandwidth	13	13	12	nm
3dB Bandwidth	15	15	15	nm
Adjacent Channel Isolation	20	20	20	dB
Non-Adjacent Channel Isolation	30	30	30	dB
Polarization Dependent Loss	0.5	0.5	0.5	dB
Output Spacing	250	500	750	µm
Operating Temperature	-5~+80	-5~+80	-5~+80	°C
Storage Temperature	-40~+85	-40~+85	-40~+85	°C
Chip Size	9.6x1.6	9.6x1.9	9.1x3.0	mm

**Notes:**

Customization is available upon request.

# Optical Power Distribution & Wavelength Management

FBT Coupler / PLC Splitter / WDM

T&S optical power distribution and wavelength management devices enable precise signal splitting, combining, and routing across diverse network architectures. Leveraging PLC wafers and chips from our subsidiary AuspChip and self-developed high-precision alignment equipment, we deliver reliable PLC splitter and WDM solutions covering a wide range of market requirements.

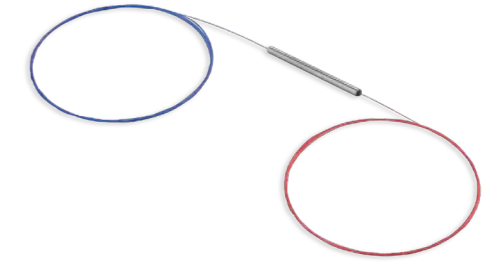
## FBT Coupler

FBT couplers offer a wide range of splitting ratios, typically ranging from 50:50 to 99:01, allowing network engineers to tailor the signal distribution according to specific requirements. A full range of mainstream packaging options is available, enabling flexible integration across different network architectures.

### Features

Passed Telcordia GR-1221-CORE reliability tests  
(Over 1500 hours tests under 85°C, 85%RH)

Low excess loss



Type	1×2 Single Mode Coupler		Unit	
Wavelength	1310 & 1550		nm	
Bandwidth	±40		nm	
Grade	P	S	-	
Insertion Loss	1/99	22.5/0.25	23.5/0.3	dB(max)
	2/98	18.8/0.3	19.5/0.35	
	5/95	14.6/0.4	15.5/0.5	
	10/90	11.5/0.65	12.0/0.8	
	20/80	7.9/1.2	8.0/1.4	
	30/70	5.9/1.9	6.0/2.1	
	40/60	4.7/2.7	4.9/2.9	
50/50	3.6/3.6	3.8/3.8		
Uniformity	50/50	0.5	0.7	dB(max)
PDL		0.2	0.25	dB(max)
Return Loss		55		dB(max)
Operating Temperature	50/50	-40 ~ +85		°C

Type	1×2 Multi Mode Coupler		Unit	
Wavelength	850 & 1300		nm	
Bandwidth	±20		nm	
Grade	P	S	-	
Insertion Loss	20/80	7.8/1.4	8.1/1.7	dB(max)
	30/70	6.0/2.1	6.3/2.4	
	40/60	4.7/2.7	5.0/3.0	
	50/50	3.7/3.7	4.0/4.0	
Uniformity	50/50	0.7	1.0	dB(max)
Directivity		35		dB(max)
Operating Temperature		-40 ~ +85		°C

## PLC Splitter

Backed by in-house PLC wafer and chip fabrication and an automated precision alignment process, T&S PLC splitters deliver low insertion loss and high stability for next-generation FTTx and high-density optical access networks. Offered in rack-mount, module, bare fiber, mini, and micro form factors, the product family supports split ratios up to 1×128 and 2×128, enabling flexible deployment and scalable network expansion.

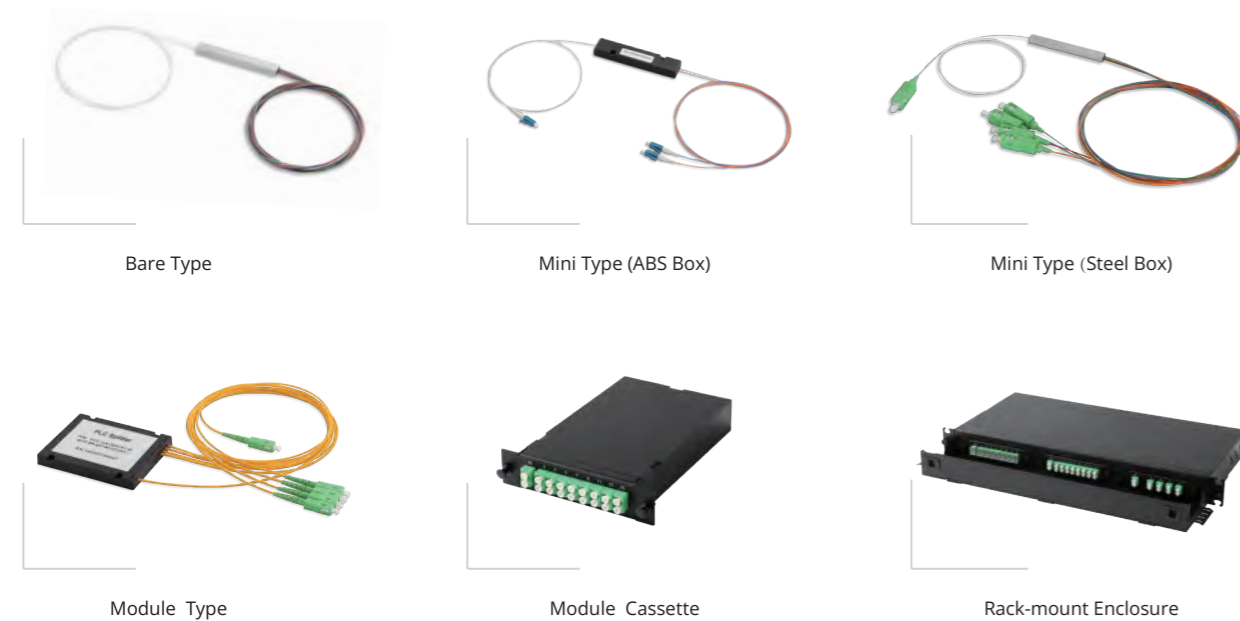
### Features

- Wide operating wavelength range
- Low insertion loss and low PDL
- Excellent channel uniformity
- Compact and space-efficient design
- High reliability and long-term stability
- Telcordia GR-1209-CORE and GR-1221-CORE qualified
- Fully RoHS compliant

### Applications

- FTTx
- Cable Television (CATV)
- Local Area Network (LAN)
- Test Equipment
- Passive Optical Network (PON)

### Packaging



Bare Type

Mini Type (ABS Box)

Mini Type (Steel Box)

Module Type

Module Cassette

Rack-mount Enclosure

## PLC Splitter

### Technical Specification

Operating Wavelength(nm)		1260~1650							
<b>1xN PLC Splitter</b>		1×2	1×4	1×8	1×16	1×32	1×64	1×128	
Insertion Loss	(dB) MAX (P/S)	3.8/4.0	7.0/7.4	10.5/10.7	13.6/13.9	16.6/16.9	21/21.5	24/24.5	
Uniformity	(dB) MAX (P/S)	0.6/0.6	0.6/0.7	0.8/1.0	0.9/1.2	1.2/1.4	1.7/1.9	2.2/2.5	
Return Loss	(dB) MIN	55							
PDL	(dB) MAX (P/S)	0.15/0.25	0.15/0.25	0.2/0.25	0.2/0.3	0.25/0.3	0.25/0.35	0.4/0.45	
<b>2xN PLC Splitter</b>		2×2	2×4	2×8	2×16	2×32	2×64	-	
Insertion Loss	(dB) MAX (P/S)	4.0/4.3	7.4/7.6	10.7/11.0	14/14.5	17.5/18	21.4/21.9	-	
Uniformity	(dB) MAX (P/S)	0.9/1.1	1.0/1.2	1.0/1.2	1.2/1.5	1.5/1.8	2.0/2.3	-	
Return Loss	(dB) MIN	55							
PDL	(dB) MAX (P/S)	0.25/0.3	0.25/0.3	0.25/0.3	0.3/0.35	0.3/0.35	0.35/0.4	-	
Fiber Type		ITU-T G657A1, G657A2							
Temperature Stability	(dB) MAX	0.5 (Typical 0.3)							
Operation Temperature (°C)		-40~+85							
Storage Temperature (°C)		-40~+85							

### Encapsulation Information

#### 1×N Splitter

Package Type & Size	Unit (mm)	1×2	1×4	1×8	1×16	1×32	1×64
Bare Type PLC Splitter	L × W × H	40×4×4	40×4×4	40×4×4	45×5×4	55×7×4	60×12×4
Mini Type PLC Splitter		60×7×4	60×7×4	60×7×4	60×12×4	80×20×6	100×40×6
Module Type PLC Splitter		90×20×10	100×80×10	100×80×10	120×80×18	120×80×18	140×114×18

#### 2×N Splitter


Package Type & Size	Unit (mm)	2×2	2×4	2×8	2×16	2×32	2×64
Bare Type PLC Splitter	L × W × H	50×5×4	50×5×4	50×5×4	55×7×4	60×7×4	65×12×4
Mini Type PLC Splitter		65×7×4	65×7×4	65×7×4	80×20×6	80×20×6	100×40×6
Module Type PLC Splitter		90×20×10	100×80×10	100×80×10	120×80×18	140×114×18	140×114×18

## WDM Devices


### 3-Ports TFF DWDM/FWDM/CWDM Device

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
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#### TFF CWDM Device

2x1/4x2	1270-1610 or 1271-1611	Glass Tube (2x1) Glass Tube Stainless Steel Tube ABS Box	Φ3.2*26 Φ4.0*26 Φ5.5*38 90*20*10	
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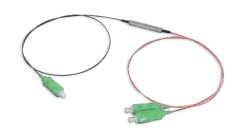
#### TFF DWDM 3 Ports Device

2x1	50Ghz DWDM(C_Band) 100Ghz DWDM(C+L_Band) 150Ghz DWDM(O_Band) 200Ghz DWDM(C+L_Band)	Glass Tube Glass Tube Stainless Steel Tube ABS Box	Φ3.2*26 Φ4.0*26 Φ5.5*38 90*20*10	
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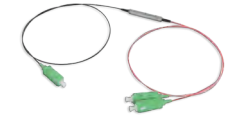
#### TFF 1310-1490-1550-1625nm FWDM

2x1/4x2	1310/1490/1550/1625	Glass Tube (2x1) Glass Tube Stainless Steel Tube ABS Box	Φ3.2*26 Φ4.0*26 Φ5.5*38 90*20*10	
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#### TFF 1310-1490-1550nm FWDM



2x1/4x2	1310/1490/1550	Glass Tube (2x1) Glass Tube Stainless Steel Tube ABS Box	Φ3.2*26 Φ4.0*26 Φ5.5*38 90*20*10	
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#### TFF 1310-1550nm FWDM

2x1/4x2	1310/1550	Glass Tube (2x1) Glass Tube Stainless Steel Tube ABS Box	Φ3.2*26 Φ4.0*26 Φ5.5*38 90*20*10	
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### High Isolation FWDM Device

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
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2x1	1310/1550-High Isolation T-ISO>45dB R-ISO>45dB	Glass Tube Stainless Steel Tube ABS Box	Φ4.0*26 Φ5.5*38 90*20*10	
4x2	1310/1550-High Isolation T-ISO>45dB R-ISO>45dB	Glass Tube Stainless Steel Tube ABS Box	Φ4.0*26 Φ5.5*38 90*20*10	

## WDM Devices


### CWDM / DWDM / Lan\_WDM / MWDM Module

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
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#### 4ch&6ch&12ch CWDM Module

1x4	1270/1290/1310/1330 or 1271/1291/1311/1331	Aluminum Flat Box Cartridge ABS Box	60*50*7.0 130*100*25 100*80*10/100*45*10	
1x6	1270/1290/1310/1330/1350/1370 or 1271/1291/1311/1331/1351/1371	ABS Box Cartridge	100*80*10 130*100*25	
1x12	1270/1290/1310/1330/1350/1370 &1470/1490/1510/1530/1550/1570 or 1271/1291/1311/1331/1351/1371 &1471/1491/1511/1531/1551/1571	ABS Box Cartridge	120*80*18 130*100*25	


#### TFF CWDM Module

1XN or 2*(1XN)	1270-1610 or 1271-1611	ABS Box Cartridge LGX Box Enclosure	L100*W80*H10(2/4/6/8CH) L120*W80*H18(12/16CH) 140*115*18(32/64CH) 130*100*25 129*160*29 483*200*44	
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#### TFF O\_Band DWDM Module(150hz)

1x8	1290.818 1294.161 1291.652 1295.000 1292.487 1295.839 1293.324 1296.680	ABS Box Cartridge LGX Box	100*80*10/120*80*18 130*100*25 129*160*29	
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#### TFF 100GHz DWDM Module

1XN or 2*(1XN)	O_Band or C+L_Band(C11-C63/L10-L56)	ABS Box Cartridge LGX Box Enclosure	L100*W80*H10(2/4/6/8CH) L120*W80*H18(12/16CH) 140*115*18(32/64CH) 130*100*25 129*160*29 483*200*44	
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#### TFF 200GHz DWDM Module

1XN or 2*(1XN)	C11-C63/L10-L56	ABS Box Cartridge LGX Box Enclosure	L100*W80*H10(2/4/6/8CH) L120*W80*H18(12/16CH) 140*115*18(32/64CH) 130*100*25 129*160*29 483*200*44	
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#### 4ch & 6ch & 12ch Lan\_WDM Module

1x4	CH07 1295.56 CH08 1300.05 CH09 1304.58 CH10 1309.14	Aluminum Flat Box Cartridge ABS Box	60*50*7.0 130*100*25 100*80*10/100*45*10	
1x6	CH01 1269.23 CH05 1286.65 CH02 1273.54 CH06 1291.10 CH03 1277.89 CH04 1282.26	ABS Box Cartridge	100*80*10 130*100*25	


## WDM Devices

← Continued on previous page

### 4ch & 6ch & 12ch Lan\_WDM Module

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
1x12	CH01 1269.23 CH05 1286.65 CH09 1304.58 CH02 1273.54 CH06 1291.10 CH10 1309.14 CH03 1277.89 CH07 1295.56 CH11 1313.73 CH04 1282.26 CH08 1300.05 CH12 1318.35	ABS Box 120*80*18 Cartridge 130*100*25 LGX Box 129*160*29	


### 6ch & 12ch MWDM Module

1x6	CH01 1267.50 CH05 1307.50 CH02 1274.50 CH06 1314.50 CH03 1287.50 CH04 1294.50	ABS Box 100*80*10 Cartridge 130*100*25	
1x12	CH01 1267.50 CH05 1307.50 CH09 1347.50 CH02 1274.50 CH06 1314.50 CH10 1354.50 CH03 1287.50 CH07 1327.50 CH11 1367.50 CH04 1294.50 CH08 1334.50 CH12 1374.50	ABS Box 120*80*18 Cartridge 130*100*25 LGX Box 129*160*29	


### CWDM/DWDM OADM Module

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
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#### TFF CWDM OADM Module

1X1/2X2/4X4/8X8	1270-1610 or 1271-1611	ABS Box L100*W80*H10(1CH/2CH/4CH) Cartridge L120*W80*H18(8CH) LGX Box 130*100*25 129*160*29	
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#### TFF 100GHz DWDM OADM Module

1X1/2X2/4X4/8X8	C11-C63/L10-L56	ABS Box L100*W80*H10(1/2/4CH) Cartridge L120*W80*H18(8CH) LGX Box 130*100*25 129*160*29	
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#### TFF 200GHz DWDM OADM Module


1X1/2X2/4X4/8X8	C11-C63/L10-L56	ABS Box L100*W80*H10(1CH/2CH/4CH) Cartridge L120*W80*H18(8CH) LGX Box 130*100*25 129*160*29	
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### X-PON WDM


Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
1x2	GPON+XGSPON XGSPON+25G-PON XGSPON+50G-PON	Aluminum Flat Box 60*25*7	
1x3	GPON+XGSPON+25G-PON GPON+XGSPON+50G-PON	Aluminum Flat Box 60*50*7	
1x4	GPON+XGSPON+NG-PON2+OTDR	Aluminum Flat Box 60*50*7	
1x5	GPON+XGSPON+50G-PON+OTDR+RF-Video	ABS Box 100*80*10 Cartridge 130*100*25 LGX Box 129*160*29	

## WDM Devices


### AAWG (Gauss) Module

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
1x16/1x32/1x40/1x48	C21-C60/C15-C62	120x75x12.7(Aluminum Flat Box) 483x200x44(Enclosure)	

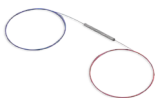
### Band Separators WDM Device

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
2x1	L-Red/Blue&C-Red/Blue C/L_band	Φ3.2x26 Glass Tube; Φ4.0x26 Glass Tube; Φ5.5x38 Stainless Steel Tube; 90x20x10 ABS Box	

### CCWDM

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
1x8+1 1x9 1x18	1270-1610 or 1271-1611	Aluminium Flat Box: 50x29x7 70x60x7	

### Fused WDM

Port Configuration	Wavelength(nm)	Encapsulation (mm)	Product
1x2	1310/1550	Φ3x55 Stainless Steel Tube; Φ3x60 Stainless Steel Tube; 90x20x10 ABS Box; 100x80x10 ABS Box	

# Active Optical Connectivity

## Fiber Optic Transceivers / Active Optical Cables (AOCs)

T&S Active Optical Cables (AOCs) and optical transceivers provide high-performance interconnect solutions for data centers, telecom, HPC, and enterprise networks, supporting data rates from 10G to 800G and beyond. Backed by large-scale manufacturing, rigorous quality control, and in-house R&D, our products ensure reliability, broad compatibility, and readiness for next-generation connectivity.

### Compatibility Tested:

Facilities equipped with mainstream network switches for verified interoperability.

### High-Speed Performance:

Supports 10Gbps to 800Gbps, with emerging 1.6T technologies.

### Diverse Form Factors:

SFP+, QSFP+, QSFP28, QSFP-DD, OSFP etc. for various applications.

## Fiber Optical Transceiver



SFP+



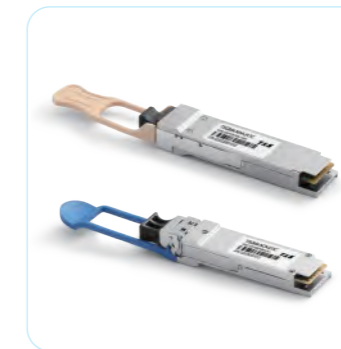
SFP28



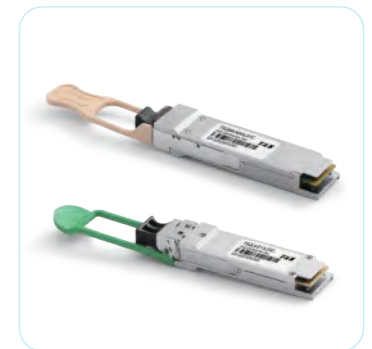
SFP BIDI



QSFP+



QSFP28



QSFP56/QSFP112



QSFP-DD (2MPO-12/MPO16/MPO24)



OSFP (MPO16/MPO24)



OSFP (2MPO-12)

### 10G Transceiver

PN	Product	TX	RX	Reach
TSSLS-NAACB1C/TSSLS-NAACB1T	10G SFP+ SR	VCSEL	PIN	300m
TSSLS-NCNCE3C/TSSLS-NCNCE3T	10G SFP+ LR	DFB	PIN	10km
TSSLS-CXXCE3C	10G SFP+ CWDM 15dB	DFB	PIN	10km
TSSLS-CXXCK8C	10G SFP+ CWDM 25dB	EML	APD	80km
TSSLS-DXXCH4C	10G SFP+ DWDM	EML(50G Hz/100G Hz)	PIN	40km
TSSLS-DXXCK8C	10G SFP+ DWDM	EML(50G Hz/100G Hz)	APD	80km
TSSLS-NCNCH4C	10G SFP+ ER	DFB	PIN	40km
TSSLS-NCNCK8C	10G SFP+ ZR	EML	APD	80km
TSSLS-CBDCE3C	10G SFP+ BIDI LR	1270nm DFB	1330nm PIN	10km
TSSLS-CDBCE3C	10G SFP+ BIDI LR	1330nm DFB	1270nm PIN	10km
TSSLS-CBDCH3C	10G SFP+ BIDI ER	1270nm DFB	1330nm PIN	40km
TSSLS-CDBCH3C	10G SFP+ BIDI ER	1330nm DFB	1270nm PIN	40km
TSSLS-CEFCK8C	10G SFP+ BIDI ZR	1490nm EML	1550nm APD	80km
TSSLS-CFECK8C	10G SFP+ BIDI ZR	1550nm EML	1490nm APD	80km

## Fiber Optical Transceiver

### 25G Transceiver

PN	Product	TX	RX	Reach
TSSLS-NAAEA1C/TSSLS-NAAEA1T	25G SFP28 SR	VCSEL	PIN	100m
TSSLS-NCNEE3C/TSSLS-NCNEE3T	25G SFP28 LR	DFB	PIN	10km
TSSLS-CXEE3C	25G SFP28 CWDM	DFB	PIN	10km
TSSLS-DXEE4C	25G SFP28 DWDM	EML	PIN	10km
TSSLS-NCNEH8C	25G SFP28 ER	EML	APD	40km
TSSLS-CBDEE3C	25G SFP28 BIDI LR	1270nm DFB	1330nm PIN	10km
TSSLS-CDBEE3C	25G SFP28 BIDI LR	1330nm DFB	1270nm PIN	10km
TSSLS-CBDEF3C	25G SFP28 BIDI LR	1270nm DFB	1330nm PIN	20km
TSSLS-CDBEF3C	25G SFP28 BIDI LR	1330nm DFB	1270nm PIN	20km
TSSLS-CBDEH7C	25G SFP28 BIDI ER	1270nm DFB	1310nm APD	40km
TSSLS-CDBEH7C	25G SFP28 BIDI ER	1310nm DFB	1270nm APD	40km

### 40G Transceiver

PN	Product	TX	RX	Reach
TSQM4-NAAGA1C/TSQM4-NAAGA1T	40G QSFP+ SR4	VCSEL	PIN	150m
TSQL4-E11GD3C	40G QSFP+ LR4	CWDM 1271/1291/1311/1331nmDFB	PIN	2km
TSQL4-E11GE3C	40G QSFP+ LR4	CWDM 1271/1291/1311/1331nmDFB	PIN	10km
TSQL4-E11GH7C	40G QSFP+ ER4	CWDM 1271/1291/1311/1331nmDFB	APD	40km
TSQM4-NCNGD3C	40G QSFP+ PSM4	1310nm DFB	PIN	2km
TSQM4-NCNGE3C	40G QSFP+ PSM4	1310nm DFB	PIN	10km

### 100G Transceiver

PN	Product	TX	RX	Reach
TSQM4-NAAJA1C/TSQM4-NAAJA1T	100G QSFP28 SR4	850nm VCSEL	PIN	100m
TSQL4-F22JE3C	100G QSFP28 LR4 Ethernet	LWDM 1296-1309nm DFB	PIN	10km
TSQL4-F22KE3C	100G QSFP28 LR4 OTU4	LWDM 1296-1309nm DFB	PIN	10km
TSQL4-E11JD3C	100G QSFP28 CWDM4	CWDM 1271/1291/1311/1331nm DFB	PIN	2km
TSQL4-E11JE3C	100G QSFP28 eCWDM4	CWDM 1271/1291/1311/1331nm DFB	PIN	10km
TSQL4-F22JG8C/TSQL4-F22JH8C	100G QSFP28 ER4	LWDM 1296-1309nm EML	APD	30km/40km
TSQM4-NCNJD3C	100G QSFP28 PSM4	1310nm DFB	PIN	2km
TSQL4-F22JKAC	100G QSFP28 ZR4	LWDM EML	SOA+PIN	80km
TSQM4-NAAKA1X	128GFC QSFP28 SW4	850nm VCSEL	PIN	100m
TSQM2-NAAJA1X	100G QSFP56 SR2	850nm VCSEL	PIN	100m
TSQM4-NAAJA1CA	100G QSFP28 SR4 Dual Rate	850nm VCSEL	PIN	100m
TSQM4-NAAJB1C	100G QSFP28 ESR4	850nm VCSEL	PIN	300m

### 200G Transceiver

PN	Product	TX	RX	Reach
TSQM4-NAALA1C	200G QSFP56 SR4	850nm VCSEL	PIN	100m
TSQL4-E11LD3C	200G QSFP56 FR4	DFB	PIN	2km
TSQL4-E11LE4C	200G QSFP56 FR4	EML CWDM4	PIN	10km
TSQL4-F22LE4C	200G QSFP56 LR4	EML LWDM	PIN	10km
TSDR8-NAALA1C/TSDR8-NAALA1T	200G QSFP-DD SR8	850nm VCSEL	PIN	100m
TSEM2-NAALA1CB	200G NDR OSFP-RHS	850nm VCSEL	PIN	50m
TSQM2-NAALA1C	200G QSFP112 SR2	850nm VCSEL	PIN	100m

### 400G Transceiver

PN	Product	TX	RX	Reach
TSBX8-NAAMA1C	400G OSFP SR8	850nm VCSEL	PIN	100m
TSBM4-NCNMC4C	400G OSFP DR4	1310nm EML	PIN	500m
TSBM4-NCNMC9C	400G OSFP DR4	Silicon Photonics	PIN	500m
TSBM4-NAAMA1C	400G OSFP SR4	850nm VCSEL	PIN	100m
TSEM4-NAAMA1C	400G OSFP-RHS SR4	850nm VCSEL	PIN	100m
TSDN8-NAAMA1C	400G QSFP-DD SR8	850nm VCSEL	PIN	100m
TSDM4-NCCMC4C	400G QSFP-DD DR4	1310nm EML	PIN	500m
TSDM4-NCCMC9C	400G QSFP-DD DR4	Silicon Photonics	PIN	500m
TSDL4-E11MD4C	400G QSFP-DD FR4	CWDM EML	PIN	2km
TSDL4-E11ME4C	400G QSFP-DD LR4	CWDM EML	PIN	10km
TSDL8-F22MH8C	400G QSFP-DD ER8	LWDM EML	APD	40km
TSQM4-NAAMA1C	400G QSFP112 SR4	850nm VCSEL	PIN	100m
TSBX4-NAAMP1C	400G OSFP VR4	850nm VCSEL	PIN	50m
TSBMH-NAAMP1C	400G OSFP VSR4	850nm VCSEL	PIN	50m

## Fiber Optical Transceiver

PN	Product	TX	RX	Reach
TSEX8-NAAMA1X	400G OSFP-RHS SR8	850nm VCSEL	PIN	100m
TSEM4-NAAMP1C	400G OSFP-RHS VR4	850nm VCSEL	PIN	50m
TSQM4-NAAMP1C	400G QSFP112 VR4	850nm VCSEL	PIN	50m
TSDMH-NAAMA1C	400G QSFP-DD SR4	850nm VCSEL	PIN	100m

### 800G Transceiver

PN	Product	TX	RX	Reach
TSBX8-NAANA1C	800G OSFP SR8	850nm VCSEL	PIN	100m
TSBX8-NCCNC9C	800G OSFP DR8	Silicon Photonics	PIN	500m
TSDN8-NAANA1C	800G QSFP-DD SR8	850nm VCSEL	PIN	100m
TSEX8-NAANA1C	800G OSFP-RHS SR8	850nm VCSEL	PIN	100m
TSDN8-NAANP1C	800G QSFP-DD VR8	850nm VCSEL	PIN	50m
TSBX8-NAANP1C	800G OSFP VR8	850nm VCSEL	PIN	50m
TSEX8-NAANP1C	800G OSFP-RHS VR8	850nm VCSEL	PIN	50m

### 1.6T Transceiver

PN	Product	TX	RX	Reach
TSBX8-NCCQC9C	1.6T OSFP 2xDR4	Silicon Photonics	PIN	500m
TSBX8-E11QD9C	1.6T OSFP 2xFR4	Silicon Photonics	PIN	2km

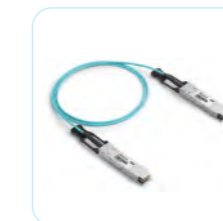
## Active Optical Cable



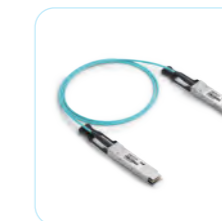
SFP+/SFP28/SFP56



SFP-DD



QSFP+/QSFP28/QSFP56



OSFP112



QSFP-DD



OSFP-RHS



OSFP



OSFP to OSFP112



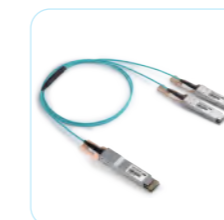
OSFP to QSFP-DD



QSFP28 to 2SFP28



QSFP28 to 2QSFP28  
QSFP56 to 2QSFP56  
QSFP56 to 2QSFP28



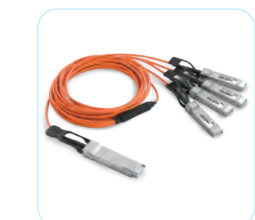
QSFP-DD to 2QSFP28  
QSFP-DD to 2QSFP56



OSFP to 2QSFP112



OSFP to 2OSFP  
OSFP-RHS to 2OSFP-RHS



QSFP+ to 4SFP+  
QSFP28 to 4SFP28  
QSFP56 to 4SFP56

## Active Optical Cable



QSFP-DD to 4SFP-DD



QSFP-DD to 4QSFP56



OSFP to 4QSFP112



QSFP-DD to 8SFP+  
QSFP-DD to 8SFP28  
QSFP-DD to 8SFP56



OSFP to 8QSFP28

### 10G/25G/40G/50G/56G/80G AOC

PN	Product	Max. Power Consumption	Reach
TSSSS-85C-XXXX/TSSSS-85C-XXXT	10G SFP+ AOC	0.8W	82m OM2/300m OM3
TSSSS-85E-XXXX/TSSSS-85E-XXXT	25G SFP28 AOC	0.8W	70m OM3/100m OM4
TSQSQ-85G-XXXX/TSQSQ-85G-XXXT	40G QSFP+ AOC	1.4W	82m OM2/300m OM3
TSQ4S-85G-XXXX/TSQ4S-85G-XXXT	40G QSFP+ to 4x10G SFP+ AOC	1.4W/0.8W	82m OM2/300m OM3
TSSSS-85H-XXXX	50G SFP56 AOC	3W	70m OM3/100m OM4
TSQ2S-85Q-XXXX/TSQ2S-85Q-XXXT	50G QSFP28 to 2x25G SFP28 AOC	2.2W/0.8W	70m OM3/100m OM4
TSQSQ-85H-XXXX/TSQSQ-85H-XXXT	56G QSFP+ AOC	1.4W	82m OM2/300m OM3
TSD8S-85G-XXXX	80G QSFP-DD to 8x10G SFP+ AOC	4W/1W	300m OM3

### 100G AOC

PN	Product	Max. Power Consumption	Reach
TSQSQ-85J-XXXX/TSQSQ-85J-XXXT	100G QSFP28 AOC	2.2W	70m OM3/100m OM4
TSTST-85K-XXXX	100G SFP-DD AOC	3.5W	70m OM3/100m OM4
TSQ2Q-85J-XXXX/TSQ2Q-85J-XXXT	100G QSFP28 to 2x50G QSFP28 AOC	2.2W/1.5W	70m OM3/100m OM4
TSQ4S-85J-XXXX/TSQ4S-85J-XXXT	100G QSFP28 to 4x25G SFP28 AOC	2.2W/0.8W	70m OM3/100m OM4
TSASA-85K-XXXX	100G DSFP AOC	3.5W	70m OM3/100m OM4
TSQP4-NAAJA1C/TSQP4-NAAJA1T	100G QSFP to 4 Duplex LC AOC	2.2W	70m OM3/100m OM4
TSQST-85K-XXXXCA	100G QSFP28 to SFP-DD AOC	5.5W/3.5W	70m OM3/100m OM4
TSQPJ-NAAKA1C	100G QSFP28 to Duplex LC AOC	14W	60m OM3/100m OM4
TSQ2S-85K-XXXXCA	100G QSFP28 to 2x50G SFP56 AOC	2.2W/3W	70m OM3/100m OM4
TSQSA-85K-XXXX	100G QSFP56 to DSFP AOC	5.5W/3.5W	70m OM3/100m OM4
TST2S-85K-XXXX	100G SFP-DD to 2x50G SFP56 AOC	3.5W	70m OM3/100m OM4

### 200G AOC

PN	Product	Max. Power Consumption	Reach
TSQSQ-85L-XXXX	200G QSFP56 AOC	5.5W	70m OM3/100m OM4
TSQ4S-85L-XXXX	200G QSFP56 to 4x50G SFP56 AOC	5.5W/3W	70m OM3/100m OM4
TSQ4Q-85L-XXXX	200G QSFP56 to 4x50G QSFP56 AOC	5.5W	70m OM3/100m OM4
TSQ2Q-85L-XXXX	200G QSFP56 to 2x100G QSFP56 AOC	5.5W	70m OM3/100m OM4
TSDSD-85L-XXXX	200G QSFP-DD AOC	4W	70m OM3/100m OM4
TSD2Q-85L-XXXX	200G QSFP-DD to 2x100G QSFP28 AOC	4W/2.5W	70m OM3/100m OM4
TSD4T-85L-XXXX	200G QSFP-DD to 4x50G SFP-DD AOC	4W/3.5W	70m OM3/100m OM4
TSD8S-85L-XXXX	200G QSFP-DD to 8x25G SFP28 AOC	4W/1W	70m OM3/100m OM4
TSQ2Q-85L-XXXXA	200G QSFP56 to 2x100G QSFP28 AOC	5.5W	70m OM3/100m OM4
TSB8S-85L-XXXX	200G OSFP to 8x25G SFP28 AOC	10W/1W	70m OM3/100m OM4
TSB5Q-85L-XXXX	200G OSFP to QSFP56 AOC	10W/5.5W	30m OM3
TSB2Q-85L-XXXXCD	200G OSFP28 to 2 x 100G QSFP28 AOC	10W/2.5W	30m OM3
TSE8S-85L-XXXXA	200G OSFP56-RHS to 8 x 25G SFP28 AOC	10W/1W	30m OM3
TSE5Q-85L-XXXX	200G OSFP-RHS to QSFP56 AOC	10W/5.5W	30m OM3
TSQ2A-85L-XXXX	200G QSFP56 to 2x100G DSFP AOC	5.5W/3.5W	70m OM3/100m OM4
TSQSQ-85S-XXXX	200G QSFP112 AOC	10W	30m OM3
TSQ2Q-85L-XXXXA	200G QSFP112 to 2 x 100G QSFP28 AOC	10W	30m OM3
TSDP8-NAALA1C/TSDP8-NAALA1T	200G QSFP-DD to 8 Duplex LC AOC	4W	70m OM3/100m OM4

## Active Optical Cable

### 400G AOC

PN	Product	Max. Power Consumption	Reach
TSBSB-85M-XXXX	400G OSFP AOC	10W	70m OM3/100m OM4
TSDSD-85M-XXXX	400G QSFP-DD AOC	10W	70m OM3/100m OM4
TSD2Q-85M-XXXX	400G QSFP-DD to 2x200G QSFP56 AOC	10W/5.5W	70m OM3/100m OM4
TSD4Q-85M-XXXX	400G QSFP-DD to 4x100G QSFP56 AOC	10W/4.5W	70m OM3/100m OM4
TSD8S-85M-XXXX	400G QSFP-DD to 8x50G SFP56 AOC	10W/3W	70m OM3/100m OM4
TSBSB-85R-XXXX	400G OSFP112 AOC	10W	30m OM3
TSB5Q-85R-XXXX	400G OSFP112 to QSFP112 AOC	10W/10W	30m OM3
TSB2B-85R-XXXX	400G OSFP to 2x200G OSFP AOC	10W/10W	30m OM3
TSB2Q-85R-XXXX	400G OSFP to 2x200G QSFP112 AOC	10W/10W	30m OM3
TSD4Q-85M-XXXXA	400G QSFP56-DD to 4x100G QSFP28 AOC	10W/5.5W	30m OM3
TSD8Q-85M-XXXXA	400G QSFP56-DD to 8x50G QSFP28 AOC	10W/5.5W	30m OM3
TSB2B-85M-XXXX	400G OSFP56 to 2 x 200G OSFP56 AOC	10W	30m OM3
TSB2Q-85M-XXXX	400G OSFP56 to 2 x 200G QSFP56 AOC	10W/5.5W	30m OM3
TSB4Q-85M-XXXXA	400G OSFP56 to 4 x 100G QSFP28 AOC	10W/5.5W	30m OM3
TSB4Q-85M-XXXX	400G OSFP56 to 4 x 100G QSFP56 AOC	10W/5.5W	30m OM3
TSBSE-85M-XXXX	400G OSFP56 to OSFP56-RHS AOC	10W	30m OM3
TSE2Q-85M-XXXX	400G OSFP56-RHS to 2 x 200G QSFP56 AOC	10W/5.5W	30m OM3
TSE4Q-85M-XXXXA	400G OSFP56-RHS to 4 x 100G QSFP28 AOC	10W/5.5W	30m OM3
TSBSE-85R-XXXX	400G OSFP112 to OSFP112-RHS AOC	10W	30m OM3
TSESE-85R-XXXX	400G OSFP112-RHS AOC	10W	30m OM3
TSDSB-85M-XXXX	400G QSFP56-DD to OSFP56 AOC	10W	30m OM3
TSDSE-85M-XXXX	400G QSFP56-DD to OSFP56-RHS AOC	10W	30m OM3
TSDBQ-85R-XXXXCA	400G QSFP56-DD to OSFP112-RHS AOC	10W/14W	30m OM3
TSD2D-85M-XXXXCA	400G QSFP56-DD to 2 x 200G QSFP28-DD AOC	10W/4W	30m OM3
TSD4Q-85M-XXXXA	400G QSFP56-DD to 4 x 100G QSFP28 AOC	10W/5.5W	30m OM3
TSD4A-85M-XXXX	400G QSFP56-DD to 4x100G DSFP AOC	10W/3.5W	70m OM3/100m OM4
TSD8Q-85M-XXXXA	400G QSFP56-DD to 8 x 50G QSFP28 AOC	10W/5.5W	30m OM3
TSDSQ-85R-XXXXCA	400G QSFP56-DD to QSFP112 AOC	14W/10W	30m OM3
TSQSQ-85R-XXXX	400G QSFP112 AOC	10W	30m OM3
TSQ2Q-85R-XXXXA	400G QSFP112 to 2 x 200G QSFP56 AOC	10W/5.5W	30m OM3
TSQ4Q-85R-XXXXA	400G QSFP112 to 4 x 100G QSFP28 AOC	10W	30m OM3

### 800G AOC

PN	Product	Max. Power Consumption	Reach
TSDSD-85N-XXXX	800G QSFP-DD AOC	14W	30m OM3
TSBSB-85N-XXXX	800G OSFP AOC	14W	30m OM3
TSB5D-85N-XXXX	800G OSFP to QSFP-DD AOC	14W/14W	30m OM3
TSB2Q-85N-XXXX	800G OSFP to 2x400G QSFP112 AOC	14W/10W	30m OM3
TSB2B-85N-XXXX	800G OSFP to 2x400G OSFP AOC	14W/10W	30m OM3
TSB4Q-85N-XXXX	800G OSFP to 4x200G QSFP112 AOC	14W/10W	30m OM3
TSB8Q-85N-XXXXCA	800G OSFP to 8x100G QSFP28 AOC	14W/10W	30m OM3
TSB2D-85N-XXXXCA	800G OSFP to 2 x 400G QSFP-DD AOC	14W	30m OM3
TSB4Q-85N-XXXXCA	800G OSFP to 4 x 200G QSFP56 AOC	14W/10W	30m OM3
TSBSE-85N-XXXX	800G OSFP to OSFP-RHS AOC	14W	30m OM3
TSB4E-85N-XXXX	800G OSFP112 to 4 x 200G OSFP112-RHS AOC	14W/10W	30m OM3
TSESE-85N-XXXX	800G OSFP-RHS AOC	14W	30m OM3
TSE4Q-85N-XXXX	800G OSFP-RHS to 4 x 200G QSFP112 AOC	14W/10W	30m OM3
TSE8Q-85N-XXXXCA	800G OSFP-RHS to 8 x 100G QSFP28 AOC	14W/10W	30m OM3
TSD2B-85N-XXXX	800G QSFP-DD to 2 x 400G OSFP112 AOC	14W	30m OM3
TSD2Q-85N-XXXX	800G QSFP-DD to 2 x 400G QSFP112 AOC	14W/10W	30m OM3
TSD2D-85N-XXXXCA	800G QSFP-DD to 2 x 400G QSFP-DD AOC	14W	30m OM3
TSD4Q-85N-XXXXCA	800G QSFP-DD to 4 x 200G QSFP56 AOC	14W/5.5W	30m OM3
TSD8Q-85N-XXXXCA	800G QSFP-DD to 8 x 100G QSFP28 AOC	14W/10W	30m OM3

### 1.6T AOC

PN	Product	Max. Power Consumption	Reach
TSBSB-13Q-XXXX	1.6T OSFP AOC	32W	30m SMF

## Direct Attach Cable

### 10G DAC



#### Features

Single-channel full-duplex passive copper cable  
24/30 AWG  
Hot-pluggable SFP compatible connectors  
Compliant with SFP\_MSA, SFF-8431 and SFF-8472

Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compatible (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. Length (m)
TSSSS-PCC-xxC	10G SFP+ DAC	10.3125	10GBASE-CR	7

### 25G DAC



#### Features

Single-channel full-duplex passive copper cable  
26/30 AWG  
Hot-pluggable SFP compatible connectors  
Compliant with SFF-8432 and SFF-8472

Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compatible (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. Length (m)
TSSSS-PCE-xxC	25G SFP28 DAC	25.78125	25GBASE-CR	5

### 40G DAC



#### Features

4-channel full-duplex passive copper cable  
26/30 AWG  
Hot-pluggable QSFP/SFP compatible connectors  
Compliant with SFP\_MSA, SFF-8431 and SFF-8472  
Compliant with SFF-8661 and SFF-8436

Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compatible (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. Length (m)
TSQSQ-PCG-xxC	40G QSFP+ DAC	41.25	40GBASE-CR4	7
TSQ4S-PCG-xxC	40G QSFP+ to 4x10G SFP+ DAC	41.25/4x10.3125	40GBASE-CR4/ 10GBASE-CR	7

### 50G DAC



#### Features

Single-channel full-duplex passive copper cable  
26/30 AWG  
Hot-pluggable SFP compatible connectors  
Compliant with SFF-8432 and SFF-8472

Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compatible (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. Length (m)
TSSSS-PCH-xxC	50G SFP56 DAC	53.125	50GBASE-CR	3

### 56G DAC



#### Features

4-channel full-duplex passive copper cable  
26/30 AWG  
Hot-pluggable QSFP compatible connectors  
Compliant with SFF-8661 and SFF-8436

Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compatible (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. L (m)
TSQSQ-PCH-xxC	56G QSFP+ DAC	56.25	FDR	7

## Direct Attach Cable

### 100G DAC



#### Features

4-channel full-duplex passive copper cable  
26/30 AWG  
Hot-pluggable QSFP/SFP compatible connectors  
Compliant with SFF-8432 and SFF-8472  
Compliant with SFF-8661 and SFF-8636

Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compatible (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. L (m)
TSQSQ-PCJ-xxC	100G QSFP28 DAC	103.125	100GBASE-CR4/EDR	5
TSQ4S-PCJ-xxC	100G QSFP28 to 4x25G SFP28 DAC	103.125/4x25.78125	100GBASE-CR4/ 25GBASE-CR	5

### 200G DAC



#### Features

4-channel full-duplex passive copper cable  
26/30 AWG  
Hot-pluggable QSFP/SFP compatible connectors  
Compliant with SFF-8432 and SFF-8472  
Compliant with SFF-8661 and SFF-8636

Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compliant (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. L (m)
TSQSQ-PCL-xxC	200G QSFP56 DAC	212.5	200GBASE-CR4/HDR	3
TSQ4S-PCL-xxC	200G QSFP56 to 4x50G SFP56 DAC	212.5/4x53.125	200GBASE-CR4/50GBASE-CR	3
TSQ2Q-PCL-xxC	200G QSFP56 to 2x100G QSFP56 DAC	212.5/2x106.25	200GBASE-CR4/100GBASE-CR2	3

### 400G/800G DAC



#### Features

8-channel full-duplex passive copper cable  
26/30 AWG  
Hot-pluggable QSFP-DD MSA & OSFP MSA compatible  
Compliant with CMIS4.0, SFF-8432 and SFF-8472  
Compliant with SFF-8661 and SFF-8636

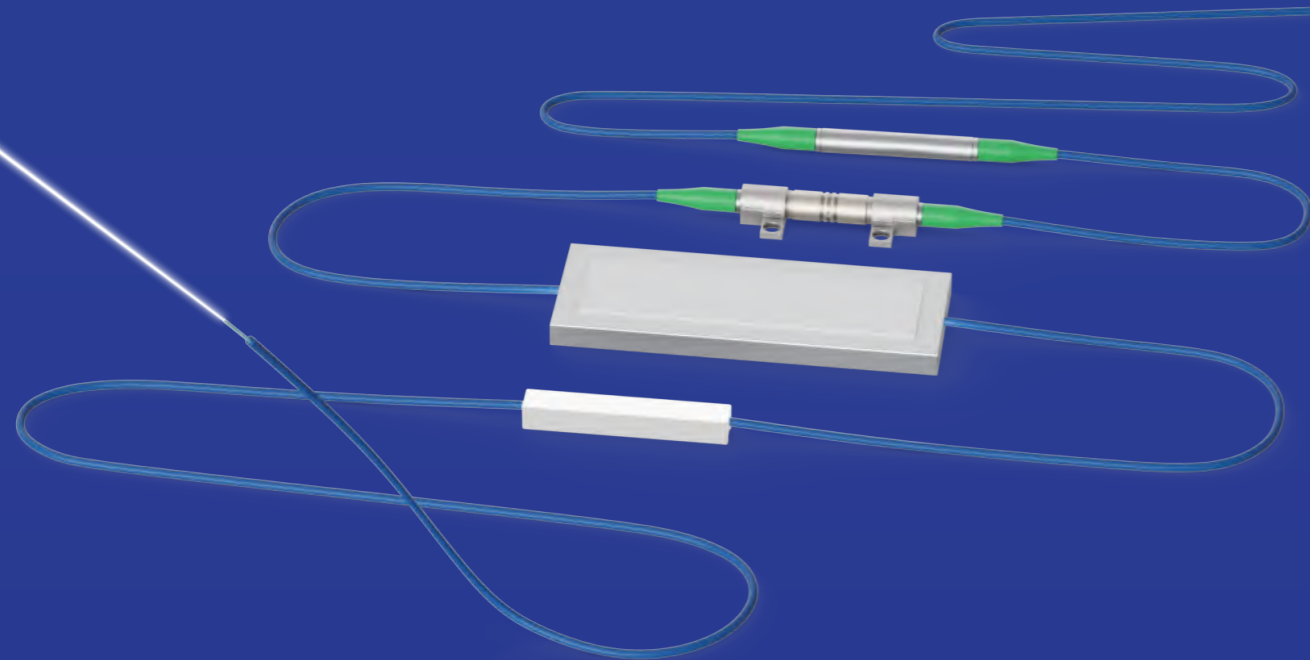
Commercial operating temperature: 0 °C to 70 °C  
EPPROM customized with I2C interface  
Enhanced EMI/EMC performance  
RoHS compliant (lead free)

PN	Product	Max. Data Rate (Gbps)	Stansard	Max. L (m)
TSDDSD-PCM-xxC	400G QSFP-DD DAC	425	400GBASE-CR8	3
TSD8S-PCM-xxC	400G QSFP-DD to 8x50G SFP56 DAC	425/8x53.125	400GBASE-CR8/50GBASE-CR	3
TSD4Q-PCM-xxC	400G QSFP-DD to 4x100G QSFP56 DAC	425/1x106.25	400GBASE-CR8/100GBASE-CR2	3
TSD2Q-PCM-xxC	400G QSFP-DD to 2x200G QSFP56 DAC	425/2x212.5	400GBASE-CR8/200GBASE-CR4	3
TSQSQ-PCM-xxC	400G QSFP112 DAC	425	400GBASE-CR4	2
TSBSB-PCM-xxC	400G OSFP112 DAC	425	400GBASE-CR4	3
TSBSQ-PCM-xxC	400G OSFP112 to QSFP112 DAC	425	400GBASE-CR4	3
TSQ2Q-PCM-xxC	400G QSFP112 to 2x200G QSFP112 DAC	425/2x212.5	400GBASE-CR4/200GBASE-CR2	2
TSB2B-PCN-xxC	800G OSFP112 To 2x400G OSFP Passive DAC	850/2x425G	800GBASE-CR8/400GBASE-CR4	3
TSDDSD-PCN-xxC	800G QSFP-DD DAC	850	800GBASE-CR8	3
TSD2Q-PCN-xxC	800G QSFP-DD To 2x400G QSFP112 DAC	850/2x425G	800GBASE-CR8/400GBASE-CR4	3
TSBSB-PCN-xxC	800G OSFP112 DAC	850	800GBASE-CR8	3

# Customized Fiber Optic Sensors, interrogators and Sensing Solutions.

T&S provides optical sensing solutions with a strong focus on Fiber Bragg Grating (FBG) technologies, covering sensors, key components, and interrogation systems.

Built on reliable grating fabrication, robust sensor packaging, and stable signal acquisition, our solutions emphasize measurement accuracy, long-term stability, and environmental adaptability, supporting both FBG-based systems and selected non-FBG fiber sensing applications.



Temperature



Strain



Vibration



Pressure



Ultrasonic



Tilt



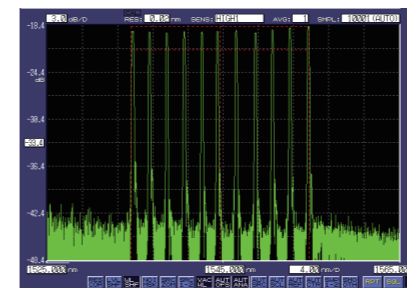
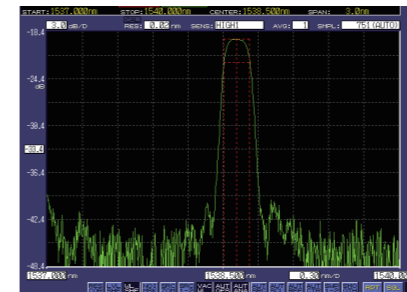
Displacement



Current

## Fiber Bragg Gratings

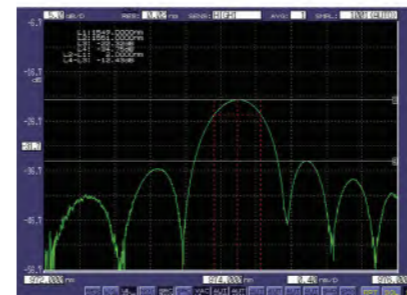
### FBG and FBG Array For Sensing



#### Technical Specification

Center Wavelength	nm	1510~1590				
Wavelength Tolerance	nm	±0.3			±0.5	
Grating Length	mm	3	5	10	10	10
Stripping Length	mm	≤10	≤10	≤20	≤20	≤20
Reflectivity	-	≥70%	≥75%	≥90%	≥95%	≥99%
-3dB Bandwidth	nm	≤0.7	≤0.7	≤0.3	≤0.3	≤0.5
SLSM	dB	≥15			≥10	
Minimum Spacing	mm	5				
Recoating	-	Acrylate / Polyimide				
Tensile Resistance	Kpsi	≥100				
Fiber Type	-	SMF-28e / Polyimide coated optical fiber				
Connector Type	-	FC/APC or Customized				
Operating Temperature	°C	SMF-28e Fiber: -20~120; Polyimide coated optical fiber: -40~300				

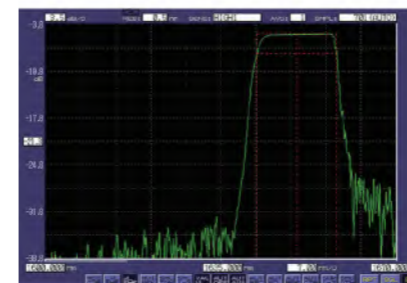
### Mode-Locking Grating



#### Technical Specification

Center Wavelength	nm	974, 976 or 980
Wavelength Tolerance	nm	±0.25
-3dB Bandwidth	nm	>0.02
Reflectivity	%	>1
Recoating	-	Acrylate / Polyimide
Tensile Resistance	kpsi	>150
Fiber Type	-	HI1060

### Chirped Grating




#### Technical Specification

Center Wavelength	nm	1550/1625/1650
-3dB Bandwidth	nm	>2
Reflectivity	%	>90 or Customized
Typical Insertion Loss	dB	0.5
Fiber Type	-	Bare Fiber
Connector Type	-	FC/APC or Customized

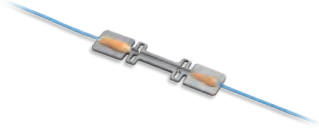
## Fiber Optic Sensor

### Strain Sensor S03




Item	Unit	Specification
Strain Range	με	±2500
Strain Accuracy	με	5
Strain Resolution	με	1
Central Wavelength	nm	1510 to 1590
Connector Type	-	FC/APC or Customized
Dimension	mm	∅ 17×64
Pigtail Type	-	∅ 3mm Armored Cable or Indoor Cable
Pigtail Length	mm	1.0 or Customized

### Strain Sensor S04



Item	Unit	Specification
Strain Range	με	±2500
Strain Accuracy	με	5
Strain Resolution	με	1
Central Wavelength	nm	1510 to 1590
Connector Type	-	FC/APC or Customized
Dimension	mm	34.5×8×0.8
Pigtail Type	-	∅0.9 fiber tube
Pigtail Length	mm	1.0 or Customized



### FBG Strain Gauge



Item	Unit	Specification
Strain Range	με	±2500
Strain Accuracy	με	5
Strain Resolution	με	1
Central Wavelength	nm	1510 to 1590
Connector Type	-	FC/APC or Customized
Dimension	mm	19×7×0.8
Pigtail Type	-	fiber ribbon+∅0.9 fiber tube
Pigtail Length	mm	1.0 or Customized


## Fiber Optic Sensor

### FBG Strain Rossette (45° / 60°)


Item	Unit	Specification
FBG Strain Rossette Angle	degree	45 or 60
Strain Range	με	±2500
Strain Accuracy	με	5
Strain Resolution	με	1
Central Wavelength	nm	1510 to 1590
Connector Type	-	FC/APC or Customized
Dimension	mm	47×44×0.7 (45°) 56×44×0.7 (60°)
Pigtail Type	-	∅ 3mm Armored Cable or Indoor Cable
Pigtail Length	mm	1.0 or Customized
Reliability	-	Conform to GR-1221-Core

### Temperature Sensor T14



Item	Unit	Specification
Temperature Range	°C	-40 to 300
Temperature Accuracy	°C	±1
Measuring Resolution	°C	0.1
Central Wavelength	nm	1510 to 1590
Dimension	mm	52×7.5×4
Connector Type	-	FC/APC or Customized
Cable Jacket	-	∅3mm spiral tube

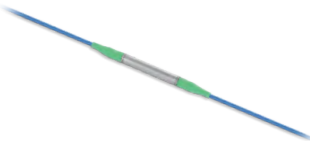
### Temperature Sensor T09/T10



Item	Unit	Specification
Temperature Range	°C	-40 to 120
Temperature Accuracy	°C	±1
Measuring Resolution	°C	0.1
Central Wavelength	nm	1510 to 1590
Dimension	mm	40×10×5
Connector Type	-	FC/APC or Customized
Cable Jacket	-	∅3mm spiral tube


## Fiber Optic Sensor

### Temperature Sensor T04




Item	Unit	Specification
Temperature Resolution	με	0.1
Strain Accuracy	με	±1
Strain Resolution	με	-40 to 150
Central Wavelength	nm	1510 to 1590
Connector Type	-	FC/APC or Customized
Dimension	mm	∅8×100
Pigtail Type	-	∅3mm Armored Cable
Pigtail Length	-	Customized

### Pressure Sensor P02



Item	Unit	Specification
Wavelength	nm	1510-1590
Measuring Range	kN	0 to 70
Resolution	-	5% F.S.
Operating Temperature	°C	-40 to +120
Packaging Material	-	Titanium alloy (TC4)
Connector Type	-	FC/APC or Customized
Dimension	mm	175×60×11
Weight	g	450


### Vibration Sensor V01



Item	Unit	Specification
Sensitivity	pm/g	30 (peak value)
Frequency Range	Hz	5-500
Resonance Frequency	Hz	1200
Maximum Impact Response	g	100
Operating Temperature	°C	-40 to +120
Dimension	mm	65×41×6
Weight	g	54
Installation	-	Screw Fixation


## Fiber Optic Sensor

### Ultrasonic Sensor US01




Item	Unit	Specification
Range of Ultrasonic Frequency to be Measured	kHz	20-50
Detection Range	m	≤1.0
Signal to Noise Ratio	dB	>25 (@40 kHz, 1.0 m)
Probe Size	mm×mm	∅13×35
Operating Temperature Range	°C	-40 to +85
Fiber Connector Type	-	FC/APC or Customized
Pigtail Length	m	1.0 or Customized

### FBG Tilt Sensor TS01



Item	Unit	Specification
Measurement Range	deg	-10 to +10
Sensitivity	pm/deg	~45
Resolution	deg	0.02
Linearity	%	99.9
Temperature Compensation	-	Included
Central Wavelength	nm	1510 to 1590
Dimension	mm×mm×mm	75×40×115
Operating Temperature Range	°C	-40 to +85
Fiber Connector Type	-	FC/APC or Customized
Pigtail Length	m	1.0 or Customized

### Fiber Optic Smart Bolt B01



Item	Unit	Specification
Linearity between wavelength and torque	%	≥99.9
Strain coefficient of wavelength	pm/με	~1.2
Torque vs. preload relationship	-	Linear
Temperature compensation	-	Included
Operating temperature range	°C	-40 to +85
Bolt size requirement	mm	Diameter ≥10, Length ≥6
Connector	-	FC/APC or Customized

## FBG ID Reflector

### FBG ID Reflector



Item	P/S <sup>1</sup>	Min.	Typical	Max.
Pass Band (nm)	-	-	1260~1360 & 1460~1610 & 1620~1630	-
Reflection Band (nm)	-	-	1645~1655	-
IL (1260nm~1360nm) (dB)	P/S	-	-	1.0/1.5
IL (1460nm~1610nm) (dB)	P/S	-	-	1.0/1.5
IL (1610nm~1625nm) (dB)	P/S	-	-	3.0/3.4
IL @ Reflect Band	dB	21	-	-
RL (1260nm~1360nm) (dB)	P/S	35/30	-	-
RL (1460nm~1580nm) (dB)	P/S	33/28	-	-
RL (1580nm~1610nm) (dB)	P/S	25/25	-	-
RL (1610nm~1625nm) (dB)	P/S	20/20	-	-
RL @ Reflect Band (dB)	-	-	-	1
Maximum Optical Power (dBm)	-	-	-	-
Operating Temperature (°C)	-	-	-	70
Operating Humidity (RH)	-	-	-	95
Storage Temperature (°C)	-	-	-	85
Connector	SC, LC			

**Notes:**  
<sup>1</sup>"P" stands for premium; "S" stands for standard.

## Electronic Sensor

### WiFi Smart Temperature and Humidity Sensor



Item	Specification
Power Supply	5V-12V DC
Communication Method	WiFi
Power Consumption	≤1W
Temperature Range	-40 °C to 80 °C
Recommended Operating Environment	5 °C to 60 °C and 20% RH to 80% RH for optimal measurement performance
Temperature Accuracy	±0.5 °C
Temperature Resolution	0.1 °C
Humidity Range	0-100% RH
Humidity Accuracy	±5% RH
Humidity Resolution	0.1% RH
WiFi Standard	802.11 b/g/n WiFi @2.4 GHz
Waterproof Rating	IP55
Dimensions	36 mm × 64 mm × 75 mm

### POE Smart Temperature and Humidity Sensor



Item	Specification
Power Supply	5V-48V or POE switch
Output Interface	RJ45 Ethernet
Power Consumption	≤1W
Temperature Range	-40 °C to 80 °C
Temperature Accuracy	±0.5 °C
Temperature Resolution	0.1 °C
Humidity Range	0-100%RH
Humidity Accuracy	±5%RH
Humidity Resolution	0.1%RH
Waterproof Rating	IP55
Dimensions	36 mm × 64 mm × 75 mm

## Fiber Optic Sensing Interrogator

### FBG Interrogator, TS-WI



General Performance	
Wavelength	1528nm to 1568nm
Optical Channel	4/8/16/24/32 channel available
Wavelength Resolution	1 pm
Wavelength Repeatability	≤3 pm
Scanning Frequency	1Hz
Communication Protocol	DL/T 860 (IEC 61850) Standard or Modbus
Optical Interface	FC/APC
Operating Temperature	-25 °C to 55 °C
Dimension	482 mm×250 mm×89 mm

### FBG Interrogator, TS-WI-HS



General Performance	
Wavelength	1525 nm to 1565 nm
Optical Channel	1/4 channel available
Wavelength Resolution	1 pm
Wavelength Repeatability	≤5 pm
Scanning Frequency	5000Hz
Communication Protocol	USB
Optical Interface	FC/APC
Operating Temperature	-25 °C to 55 °C
Dimension	256 mm×167 mm×68 mm

### FBG Interrogator, TS-HS-100



General Performance	
Wavelength	1528 nm to 1568 nm
Optical Channel	2/4/6/8/12 channel available (Customizable)
Wavelength Resolution	1 pm
Wavelength Accuracy	<3 pm
Scanning Frequency	100Hz
Communication Interface	RS485, RJ45
Optical Interface	FC/APC (Customizable)
Single-Channel Optical Power	>0.6mW
Power Supply Voltage	7-36V DC
Power Consumption	<3 W
Operating Temperature	-25 °C to 55 °C
Dimensions	256 mm×167 mm×68 mm

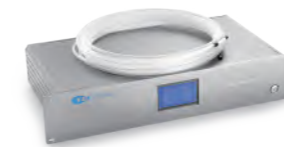
## Fiber Optic Sensing Interrogator

### Fiber Optic Ultrasonic Interrogator



General Performance	
Operating Frequency Range	20kHz-50kHz
Optical Interface	FC/APC
Number of Channels	1~3
Operating Temperature Range	-25 °C to +55 °C
Scanning Frequency	5MHz
Power Supply Voltage	220V (AC)
Maximum Power	5W
Canning Material	Aluminium Alloy
Display Size	4.3Inch
Dimension	250 mm×160 mm×80 mm

### Fiber Optic Current Interrogator



General Performance	
Measurement Accuracy	±1%FS, 50Hz
Measurement Range	50A - 5000A (RMS)
Response Range	10Hz - 10kHz
Output	LCD screen, BNC Connector
Power	100VAC - 250VAC, 50Hz/60Hz
Connectable Sensor Quantity	3
Sensing Fiber	0.9 mm PFA Tube, <5 m
Transmission Fiber	0.9 mm Tube, <5 m
Connector Type	SC/PC
Operating Temperature	-25 °C to +55 °C
Dimension	482mm×250mm×89mm