High Power Fiber Optic Patch Cable/Connector

SM, PM, MM, up to 15W. Must be used in connector pairs with matching part numbers.

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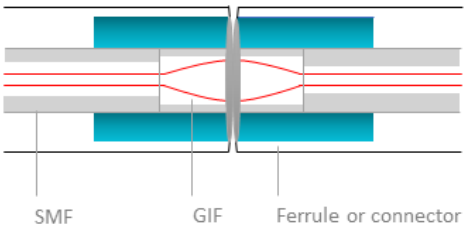
The High Power Fiber Optic Connector (HPFC) incorporates a beam-expanded fiber lens at the fiber end within a conventional butt-coupling format. The fiber tip utilizes a GRIN (graded-index) lens instead of a conventional end cap, minimizing coupling loss and enabling efficient high-power transmission. The mode field diameter (MFD) is expanded to 15 µm for 5 W operation and 35 µm for 10 W and 15 W operation. Each connector is manufactured to tight tolerances to ensure consistent performance across units with the same part number, enabling reliable and repeatable mating. HPFC connectors must be used in matched pairs with identical part numbers. Mating with conventional connectors results in higher insertion loss and does not support high-power handling. Systems using HPFC connectors typically require an additional patch cable, with one end terminated in an HPFC connector and the other end as bare fiber for splicing into the connected system. As a result, users often need to procure this additional cable for proper system integration. Polarization-maintaining (PM) fiber versions and various cabling options are available. The HPFC is well suited for high-power optical transmission systems, including applications in medical and biotechnology laser delivery, and is designed for automated, high-volume manufacturing.

Features

- High Power Handling
- Low Insertion Loss
- High Stability
- Reliability
- Low Cost



Applications

- Telecommunications
- Defense
- Medical and Biotech
- Instrumentation

Specifications

Parameter		Minimum	Typical	Maximum	Unit
Operating Wavelength		400		2000	nm
Insertion Loss*		0.01		0.35	dB
Polarization Dependent Loss			<0.02	0.15	dB
Temperature Sensitivity			0.002	0.004	dB/°C
Return Loss	SM 0°	50			dB
	SM 8°	70			
	MM	40			
Optical Power Handling**			5	15	W
Beam Diameter		15		35	µm
Operating Temperature		-40		85	°C
Connector Styles		SC, ST, FC, PC, APC, LC			

Notes:

* Insertion loss depends on fiber and MFD. @1310/1550nm

** Continuous operation. @1310/1550nm

Note: The high-power connector only works in pairs, mating between two connectors having the same part number.

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Ordering Information (Part Number)

	☐	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Model**	**Wavelength**	**Power [1]**	**Configuration [2]**	**Fiber Length**	**Fiber Type**	**Cable Type**	**Key**	**Connector [3][4]**
HPCC-	SM = 1 MM = 2 PM = 3	480 = 4 630 = 6 780 = 7 850 = 8 980 = 9 1060 = 1 1310 = 3 1400 = 2 1550 = 5 Special = 0	5W = 5 10W = 2 15W = 7 Special = 0	One Connector = 1 Two Connectors = 2 Special = 0	1m = 1 1.5m = A 2m = 2 2.5m = B 3m = 3 Special = 0	RGB400 = 4 PM480 = 3 PM630 = 6 HI 780 = 7 PM980 = 9 HI1060 = 1 SMF28 = 2 50/125 = A 62.5/125 = B Special = 0	Bare fiber = 1 900um loose = 2 Special = 0	Regular = 1 Narrow = 2	FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

[1]. @1310/1550nm

[2]. Two connectors is a patch cable

[3]. For MM fibers no need to have APC angle polishing

[4]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

RED color – for special order

Application Notes

Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness

Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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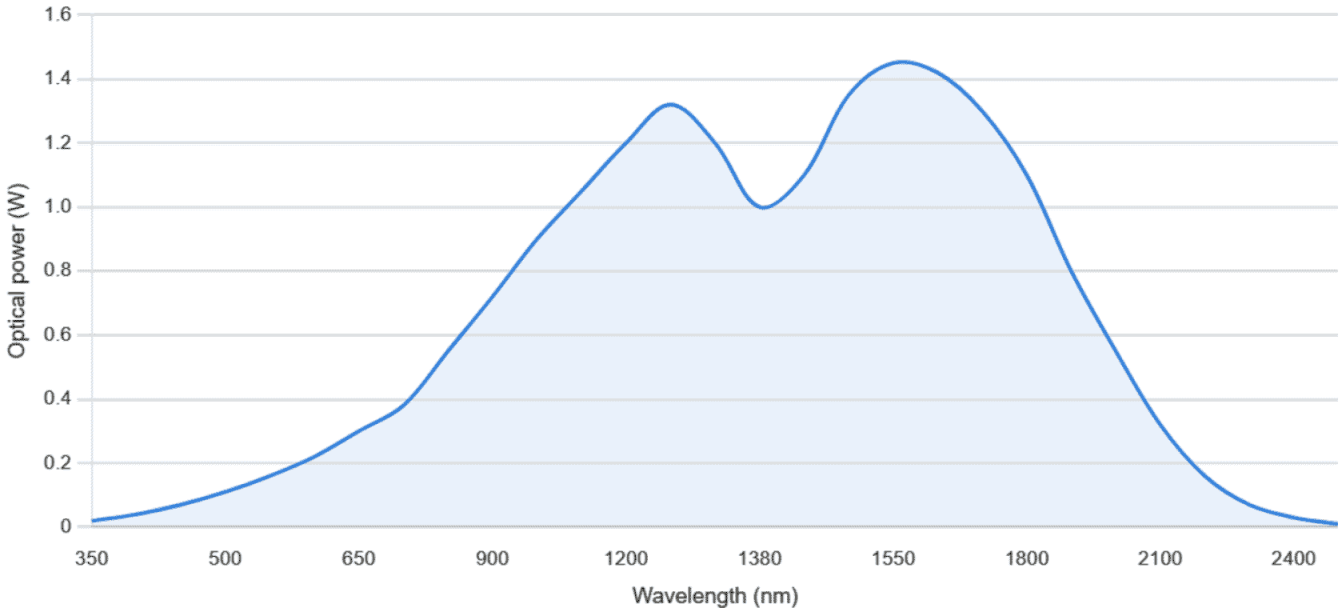
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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