

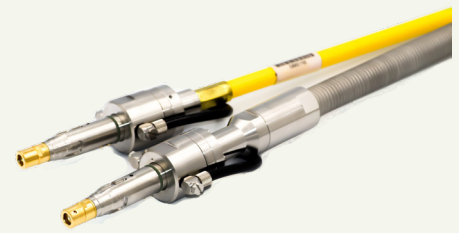


redPOWER QUBE

PIPA-Q Beam Delivery Fibers

Industrial fiber assemblies with rugged back reflection protection.

CW / Modulated Fiber Laser Accessory.



Introduction

The PIPA-Q fiber-optic cable is based on many years of experience and development of rugged delivery fibers for industrial laser applications and have been optimised for use within the redPOWER Fiber Laser range.

- Single ended pigtail variants are used for direct splicing to the output of the Fiber Laser.
- Double ended versions are used with the Fiber to Fiber coupler (FFC), where the output from a link fiber attached to the laser is coupled through free space into the double ended fiber. This allows for a quick change of the detachable double ended fiber in case of damage, or to allow a different core diameter to be used.

Inherent Back Reflection (BR) Protection

During laser processing, up to 80-90% of laser light can be reflected back onto the fibers. This back reflected radiation can potentially cause damage to the delivery fiber or even the laser. To safely handle such back reflection (before it can damage the fiber) the patented PIPA-Q technology channels the reflected light, via a capillary tube, away from the fibers and into a carefully designed water cooled annulus, increasing fiber performance and reliability.



Key Benefits

PIPA-Q fibers allow the user to process highly reflective materials without the risk of damaging the laser equipment or the optical fiber. This innovation makes it cost effective for the laser user to carry out high power cutting and welding applications of metals including copper, brass and aluminium.

Ordering Information

Single Ended Fibers

When the fibers are permanently fixed to a redPOWER Fiber Laser, they form part of the order code for the laser, and so no separate order code is necessary.

Double Ended Fibers

The table below shows the product code format and gives the configuration options and description.

SP	-	DEF	-	100 300	-	05 10 15 20	-	Q	W	Q	W	-	000
		Fiber type: Double Ended Fiber		Fiber Diameter (µm)		BDO Length (m)		Input End Type: PIPA-Q	Input End Coolant: Water	Output End Type: PIPA-Q	Output End Coolant: Water		For future extension

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SM-S01050-A

Benefits

- PIPA-Q termination
 - Robust BR protection
 - Patented design
 - Plug-in pre-aligned (PIPA) coupling
- Industry standard mechanical termination
- Integral fiber continuity monitoring system (FCMS)
 - Reassurance against fiber damage
- No coolant in contact with optical surfaces
 - Performance maintained as coolant quality degrades

Robust Optical Design

- Increased damage threshold for forward going power
- Provides a safe way to dispose of back reflected radiation
- Design provides high transmission through the fibers

Precision Mechanical Design

- Compatible with a wide range of processing heads
- Highly precise fiber tip positioning
 - Allows exchange with minimal re-alignment

Go to spilasers.com for information on our full suite of Pulsed and CW Fiber Lasers.

Specification

Optical

Single Ended Fibers (as part of redPOWER Fiber Laser)

Parameter	Value						Notes
	20µm	25µm	50µm	100µm Enhanced	100µm	300µm	
Output Fiber	20µm	25µm	50µm	100µm Enhanced	100µm	300µm	PIPA-Q Output Connector
Beam Quality, BPP ¹ , (mm.mrad)	M ² : 1.1±0.1	M ² : 1.1 typ 1.3 max	2.1±0.3	3.3±0.6	4.5±0.6	13±4	As defined ISO 11146
Beam Divergence (mrad): 86% power enclosed	82±12	70±10	170±30	130±25	180±30	175±40	Full angle at specified power
Beam Divergence (mrad): 99.5% power enclosed	<140	<120	<280	<240	≤280	<280	Full angle at specified power

Double Ended Fibers

Parameter	Value	Notes
Maximum Power (CW)	11kW	
Fiber Core Diameters	100µm 300µm	For other diameters contact SPI
Maximum Length	20m	Shorter lengths available
Maximum Input Divergence	240mrad	99.5% enclosed energy
Maximum Input Divergence Growth	15%	
Maximum Output Beam Divergence	280mrad	
Maximum Output BPP ¹ - 100µm Fiber	5mm.mrad	
Maximum Output BPP ¹ - 300µm Fiber	15mm.mrad	
Pointing Error	<11mrads	
Transmission (1070-1080nm)	>98%	With windows fitted
Transmission (630-680nm)	>70%	For red alignment laser

Safety

Parameter	Value	Notes
Fiber Continuity Safety Level	PLc	With single channel monitoring

Mechanical

Parameter	Value
Fiber End Plane Axial Position Tolerance	±30µm
Minimum Bend Radius	100mm
Maximum Tensile Load	200N
Torsional Stress	90° per m
Maximum Twisting of Fiber	360° over whole fiber length
Bend Restrictor Maximum Load	≤200N
Cable Material (External)	Anti-abrasion polyurethane (yellow)

Notes

1. Beam Parameter Product = beam radius x half angle divergence