



Advanced
Fiber
Resources

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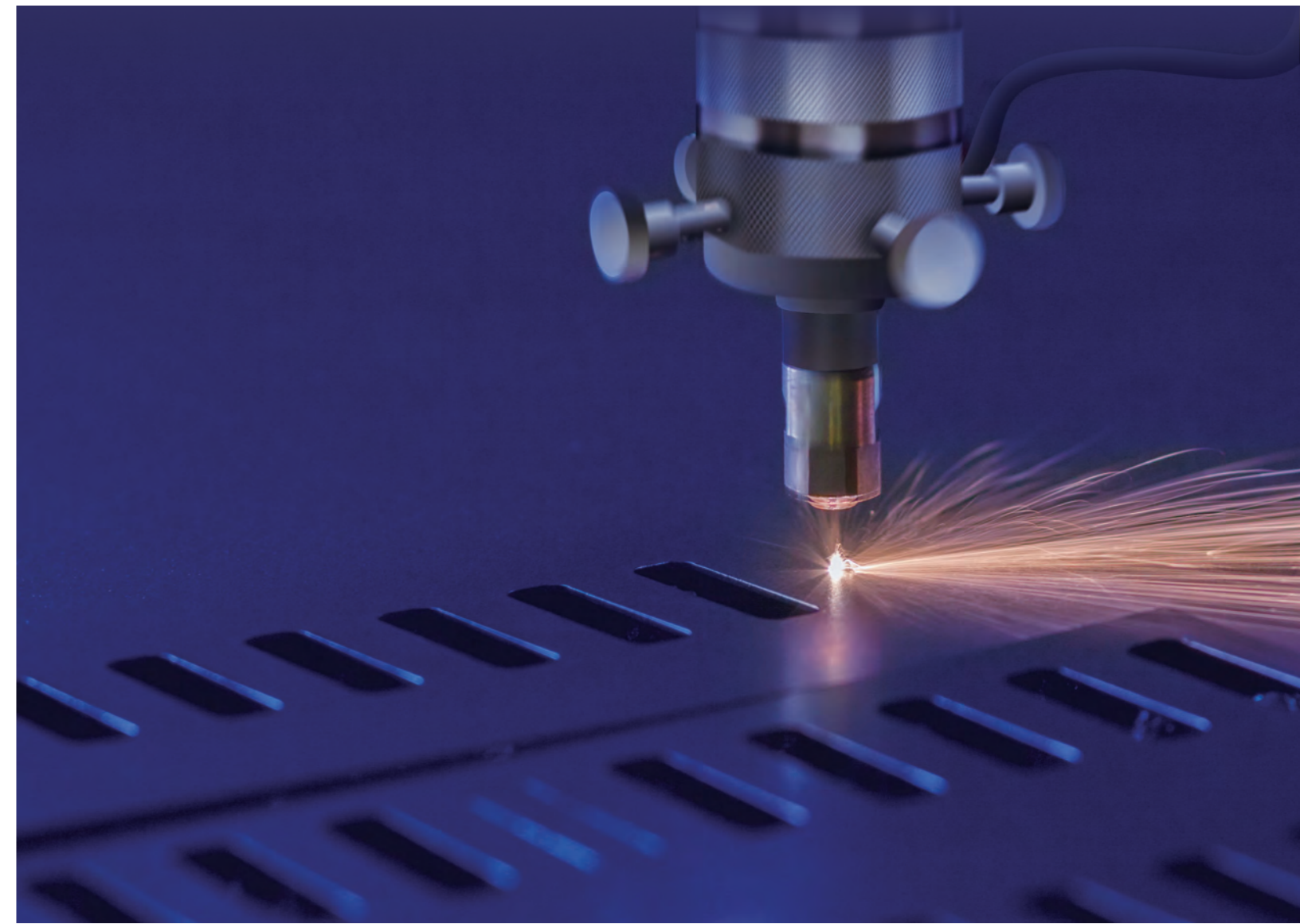
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ONE-STOP SHOP FOR FIBER LASER COMPONENTS



NO.1 CHOICE OF 600 LASER COMPANIES AND INSTITUTES



COMPANY INTRODUCTION

Advanced Fiber Resources (AFR), established in 2000, is a leading supplier of fiber optical components. With its strong R&D and design capabilities, high efficient manufacturing process and strict quality control, AFR designs and manufactures standard and custom components, modulators, and provides contract manufacturing solutions to our customers. Our products are widely used in fiber laser, telecom, data center, fiber sensing, autonomous driving, biomedical equipment, as well as research institutes and universities around the globe. AFR's products have been sold to customers in more than 40 countries and regions worldwide.



24
Years of History



2017
IPO in China



2,000
Employees



600
Customers



300
Engineers



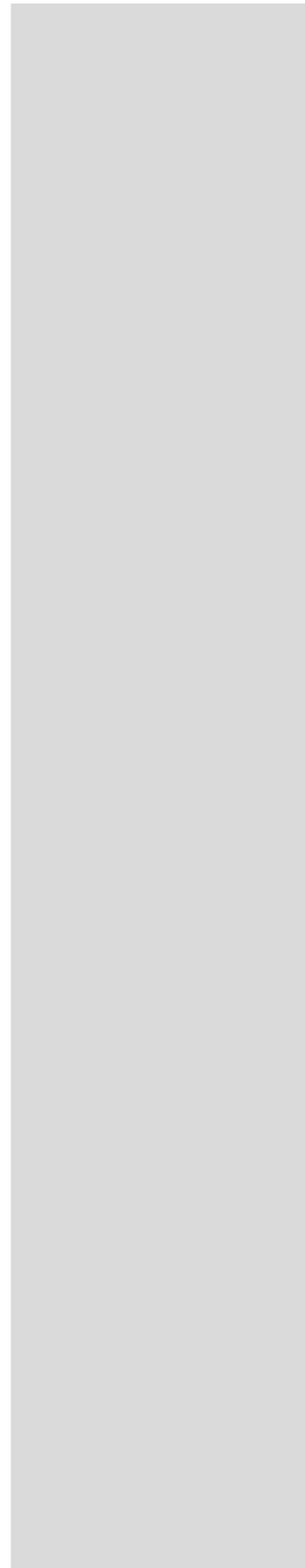
115,000
m² Facility

QUALITY

At AFR, quality is our top priority and an integral part of everything we do. The product quality management covers from product development, supply chain management, manufacturing to after-sales. AFR's quality management system fulfills the requirements of ISO 9001:2015, ISO 14001:2015 and IATF 16949, and all products are qualified with Telcordia GR-468 and GR-1221-CORE reliability test.

The company currently has seven dedicated laboratories and equipped with many high precision instruments, to ensure excellent reliability of our products. We have built an optical precision processing center and a machining center, manufacturing crystals, mirrors, PBS, other flat surface optics and mechanical components in-house, the key material production capability makes us more competitive.

We strive to continuously improve our products with proactive, data driven, quality first systems and processes.



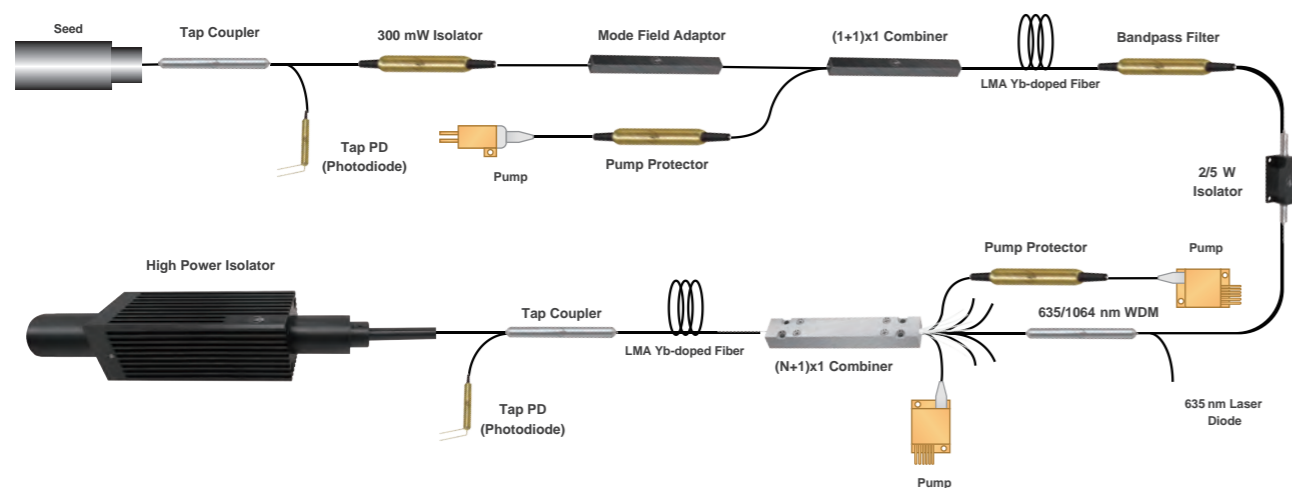
ONE-STOP SHOP FOR FIBER LASER COMPONENTS

With an extensive range of products in its portfolio, AFR provides one-stop shop of passive optical components with superior performance at reasonable cost.

AFR has more than 20 years of product customization experience, resulting in around 20,000 subdivided products. With our customization and design experience, we can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.



Isolator	Combiner	FBG	Laser Cable	Others
 In-Line Isolator	 Pump Combiner	 Fiber Bragg Grating	 D1 Laser Cable	 Coupler
 Fiber to Free Space Isolator	 Pump & Signal Combiner	 UFCG	 D2/D3 Laser Cable	 WDM
 Free Space Isolator	 Laser Combiner Module	 PSCG	 D4 Laser Cable	 Bandpass Filter
		 TC-PSCG		 Collimator
		 RSS-FBG		 Photodiode
				 MFA
				 CPS



AFR Components for Pulsed Lasers

Isolators

In-Line Isolator	Typ. Isolation	Typ. Insertion Loss
1030/1064 nm 300 mW - 500 W	30 dB	0.5 dB
2000 nm 300 mW - 50 W	25 dB	1.6 dB

Fiber to Free Space Isolator	Beam Diameter	Typ. Isolation	Typ. Insertion Loss
1030/1064 nm 20 - 500 W	7 mm (Standard) Specified	35 dB	0.5 dB
2000 nm 20 - 100 W	7 mm (Standard) Specified	25 dB	1.0 dB

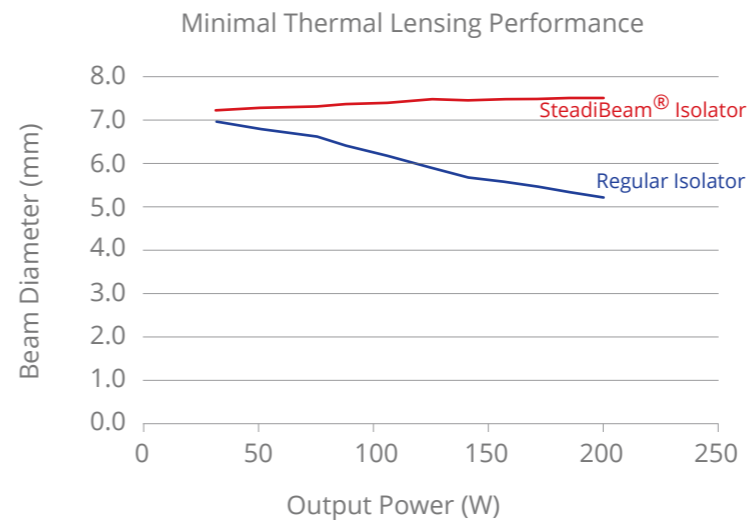
- (N+1)x1 Pump & Signal Combiner
- 635/1064 nm Fused WDM
- Photodiode
- Mode Field Adaptor
- Bandpass Filter

We can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.



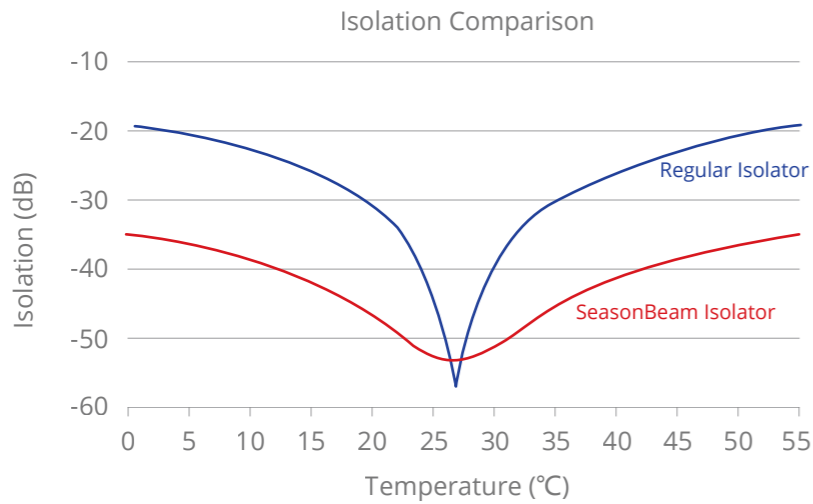
200 W SteadiBeam® Fiber Laser Isolator

Parameter	Unit	Value
Center Wavelength (λ_c)	nm	1064 ± 15
Max. Insertion Loss at 30 °C, λ_c	dB	0.4
Typ. Peak Isolation	dB	40
Min. Isolation at 30 °C	dB	30
Min. Isolation at All Temperature	dB	20
Min. Return Loss	dB	50
Nominal Output Beam Diameter ($1/e^2$)	mm	6.5 ± 0.5
Beam Circularity	%	> 90
M ² Degradation	%	< 10
Focal Shift @ 200 W	Z _R	< 0.3
Max. Average Optical Power	W	200
Max. Average Optical Power from Cladding	W	5
Max. Peak Power for ns Pulse	kW	30
Reverse Power Handling Fiber Types	W	10 Continuous 50 (3 mins max.) Specified by Ordering Info
Operating Temperature	°C	+ 10 to + 50
Storage Temperature (Non-Condensing Condition)	°C	- 10 to + 60



100 W SeasonBeam-Temperature Insensitive Fiber Laser Isolator

Parameter	Unit	Value
Center Wavelength (λ_c)	nm	1064 \pm 15
Typ. Peak Isolation	dB	40
Min. Isolation at 23 °C, λ_c All Polarization States	dB	35
Min. Isolation at All Temperature, λ_c All Polarization States	dB	30
Max. Insertion Loss at 23 °C, λ_c	dB	0.4
Max. Insertion Loss at All Temperature	dB	0.5
Min. Return Loss	dB	50
Nominal Output Beam Diameter (1/e ²)	mm	7.0 \pm 0.5
Beam Circularity	%	> 90
M ² Degradation	%	< 10
Max. Average Optical Power	W	20 - 100
Max. Peak Power for ns Pulse	kW	35
Fiber Type (Input Port)	-	Specified by Ordering Info
Operating Temperature	°C	0 to + 55
Storage Temperature	°C	- 20 to + 70



1064 nm 5 W In-Line Isolator

Parameter	Unit	Value
Center Wavelength (λ_c)	nm	1064
Operating Wavelength Range	nm	$\lambda_c \pm 10$
Min. Isolation, 23 °C, All Polarization States, at λ_c	dB	25
Typ. Insertion Loss, at 23 °C, at λ_c	dB	1.0
Max. Insertion Loss, at 23 °C, at λ_c	dB	1.3
Max. Polarization Dependent Loss	dB	0.2
Min. Return Loss (Input/Output)	dB	50/50
Max. Optical Average Power	W	5
Max. Peak Power for ns Pluse	kW	20
Fiber Type	-	Specified by Ordering Info
Max. Tensile Load	N	5
Operating Temperature	°C	+ 10 to + 50
Storage Temperature	°C	0 to + 60



1064 nm 500 W In-Line Isolator

Parameter	Unit	Value
Center Wavelength (λ_c)	nm	1064
Operating Wavelength Range	nm	$\lambda_c \pm 10$
Min. Isolation, λ_c , 23 °C, All Polarization States	dB	30
Typ. Insertion Loss, 23 °C	dB	0.45
Max. Insertion Loss, 23 °C	dB	0.6
Max. Polarization Dependent Loss	dB	0.2
Min. Return Loss	dB	45
Max. Average Optical Power	W	500
Max. Peak Power for ns Pulse	kW	50
Max. Tensile Load	N	5
Fiber Type	-	Specified by Ordering Info
Operating Temperature	°C	+ 10 to + 50
Storage Temperature	°C	0 to + 60



(N+1)×1 Multimode Pump & Signal Combiner

Parameter	Unit	Value	
Product Type	-	(2+1)×1	
Pump Wavelength Range	nm	900 - 1000	
Signal Wavelength Range	nm	1060	
Fiber Type for Input (Pump Channel)	-	105/125 (0.15 NA or 0.22 NA)	
Fiber Type for Input (Signal Channel)	-	10/125 DCF, 20/130 DCF	
Fiber Type for Output	dB	10/125 DCF, 20/130 DCF	
Max. Signal Channel Insertion Loss	%	0.5	
Typ. Pump Efficiency	%	94	
Min. Pump Efficiency	W	92	
Max. Input Pump Power	mm	2 × 5	2 × 30
Package Dimensions	°C	P1: 50 (L) × 5 (W) × 5 (H)	P2: 70 (L) × 12 (W) × 8 (H)
Operating Temperature	°C	0 to + 65	
Storage Temperature	-	- 40 to + 85	



1064 nm 500 W Fiber to Free Space Isolator

Parameter	Unit	Value
Center Wavelength (λ_c)	nm	1064 or Specified
Typ. Peak Isolation	dB	40
Min. Isolation at 23 °C, λ_c All Polarization States	dB	30
Max. Insertion Loss at 23 °C, λ_c	dB	0.4
M ² Degradation	%	< 10
Beam Roundness	%	> 90
Min. Return Loss	dB	50
Max. Average Optical Power	W	500
Max. Peak Power for ns Pulse	kW	50
Max. Tensile Load	N	5
Fiber Type (Input Port)	-	30/250 DCF or Specified
Fiber Type (Output Port)	-	Free Space
Nominal Output Beam Diameter (1/e ²)	mm	7 ± 0.5 or Specified
Operating Temperature	°C	+10 to + 50
Storage Temperature	°C	0 to + 60



2 μ m 50 W In-Line Isolator

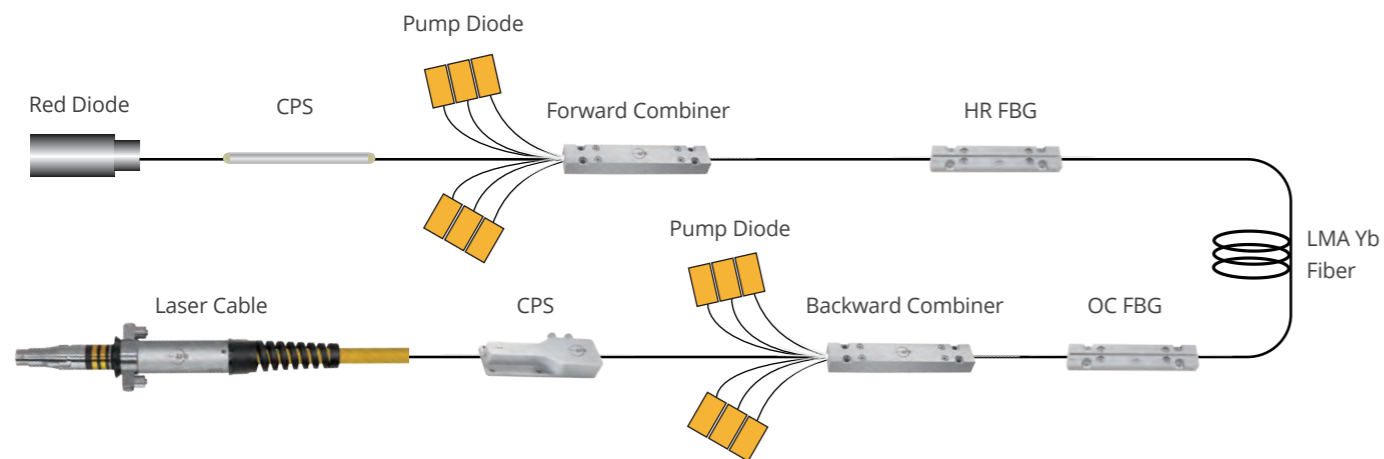
Parameter	Unit	Value
Center Wavelength (λ_c)	nm	1910, 2050
Operating Wavelength Range	nm	$\lambda_c \pm 10$
Max. Polarization Dependent Loss, 23 °C	dB	0.2
Min. Isolation, λ_c , 23 °C, All Polarization States	dB	25
Max. Insertion Loss, λ_c , 23 °C, All Polarization States	dB	1.6
Min. Return Loss (Input/Output)	dB	45/45
Max. Average Optical Power	W	50
Max. Peak Power for ns Pulse	kW	10
Max. Tensile Load	N	5
Fiber Type	-	Specified by Ordering Info
Operating Temperature	°C	+ 10 to + 50
Storage Temperature	°C	0 to + 60



2 μ m 100 W Fiber to Free-Space Isolator

Parameter	Unit	Value
Center Wavelength (λ_c)	nm	2000 or Specified
Operating Wavelength Range	nm	$\lambda_c \pm 10$
Max. Insertion Loss	dB	1
Min. Isolation @ λ_c , 25 °C	dB	25
Beam Diameter (1/e ² , Singlemode Only)	mm	0.8 ± 0.2
Beam Divergence (Far Field)	mrad	< 5
M ² Degradation	%	< 10
Beam Roundness	%	> 90
Max. Average Optical Power	W	100
Max. Peak Power for ns Pulse	kW	20
Return Loss	dB	50
Max. Tensile Load	N	5
Fiber Type	-	Specified by Ordering Info
Operating Temperature	°C	+ 10 to + 50
Storage Temperature	°C	0 to + 60





AFR Components for CW Lasers

Combiner

Product	Handling Power	Pump Efficiency	Pump/Laser Number
(N+1)x1 Forward Pump Combiner	Up to 3 kW	> 97 %	≤ 36, Specified
(N+1)x1 Backward Pump Combiner	Up to 5 kW	> 97 %	≤ 18, Specified
N x 1 Laser Combiner	Up to 30 kW	> 97 %	≤ 19, Specified

FBG

Product	Handling Power	Center Wavelength
High Power FBG	Up to 3 kW	1018, 1030, 1064, 1070, 1080, 1917, 1925, 1939 nm, Specified
RSS-FBG	Up to 3 kW	1080 nm, Specified

Laser Cable

Product	Handling Power	Center Wavelength
D1 Laser Cable	Up to 10 kW	1080 nm, Specified
D2 Laser Cable	Up to 30 kW	1080 nm, Specified
D3 Laser Cable	Up to 30 kW	1080 nm, Specified
D4 Laser Cable	Up to 500 W	1080 nm, Specified

We can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.

High Power (18+1)×1 Backward Pump & Signal Combiner

Parameter	Unit	Value
Product Type	-	Backward (18+1)×1
Pump Wavelength Range	nm	800 - 1000
Signal Wavelength Range	nm	1000 - 1100
Fiber Type for Input (Pump Channel)	-	135/155, NA 0.22
Fiber Type for Input (Signal Channel)	-	20/400, NA 0.065/0.46
Fiber Type for Output	-	20/400, NA 0.065/0.46
Max. Input Pump Power	W	18 × 300
Max. Input Signal Power	W	5000
Max. Signal Channel Insertion Loss	dB	0.2
Min. Pump Efficiency	%	97
Package Dimensions	mm	150 (L) × 15 (W) × 10 (H)
Operating Temperature	°C	- 5 to + 65
Storage Temperature	°C	- 40 to + 85



High Power 7×1 Laser Combiner

Parameter	Unit	Value
Product Type	-	7×1
Laser Wavelength	nm	1080
Fiber Type for Input	-	34/130, NA 0.095
Fiber Type for Output	-	100/120/360, NA 0.22
Max. Combined Power per Port	W	7000
Max. Backward Power Handling	W	1000
Min. Power Transfer Efficiency	%	97
Max. Beam Parameter Product (BPP)	mm·mrad	4
Max. Output NA (99%)	-	0.13
Package Dimensions	mm	205 (L) × 60 (W) × 22 (H)
Operating Temperature	°C	- 5 to + 65
Storage Temperature	°C	- 40 to + 85



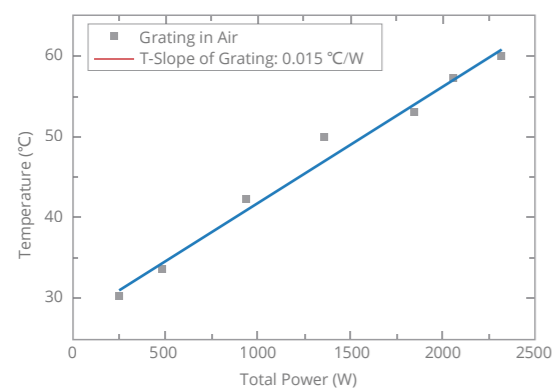
ClearCut High Power FBG

Parameter	Unit	Value			
Center Wavelength	nm	1018, 1030, 1064, 1070, 1080			
Tolerance on Center Wavelength	nm	± 1			
Max. Wavelength Mismatch (OC Relative HR)	nm	0.2			
High Reflector (HR)/Output Coupler (OC)	-	HR	OC		
Peak Reflectivity	%	≥ 99.0	(5.0 - 30.0) ± 2.0		
Reflection Bandwidth at 95%	nm	1.5 - 4.0	-		
Reflection Bandwidth at 50%	nm	-	0.2 - 2.0		
Tolerance on Reflection Bandwidth	nm	0.1 - 0.4	0.1 - 0.2		
Min. Side Mode Suppression Ratio	dB	20	10		
Fiber Core/Cladding Dimension	μm	10/125	14/250	20/400	25/400
¹ Temperature Slope Suspended in Air	°C/W	≤ 0.1	≤ 0.03	≤ 0.02	≤ 0.02
² Min. Core Signal Power Handling	W	300	1000	3000	3000
Min. Clad Pump Power Handling	W	450	1200	3000	3000
Fiber Type	-	PM or Non-PM			
Package Dimensions	mm	Recoated only or 60 (L) × 12 (W) × 5 (H)			
Cooling Bottom Plate Temperature	°C	≤ 25			
Storage Temperature	°C	- 40 to + 85			



¹For total power: the signal power in the core and the pump power in the cladding. (The slope efficiency is about 70%)

²The grating area should be kept on active cooling plates. (The cooling temperature ≤ 25 °C)



Total power: the signal power in the core and the pump power in the cladding. The output slope efficiency is about 70%.

Measurement condition: the grating in the cavity is recoated only and suspended in the air without any active cooling. The environment temperature is 22-24 °C.

3 kW Laser Cavity Component

General Parameters	Unit	Value
Operating Wavelength	nm	1080 ± 1
Max. Handling Signal Power	W	3000
¹ Max. Signal Channel Insertion Loss (Total)	dB	1.0
Storage Temperature	°C	- 40 to + 85
Operating Temperature	°C	0 to + 50
Cooling Bottom Plate Temperature	°C	≤ 25

Parameters for Combiner	Unit	Value
Product Type	-	(6+1)×1
Pump Wavelength	nm	976
Fiber Type for Input (Pump Channel)	-	BrightCore MM200/220 DCF NA0.22
Fiber Type for Input (Signal Channel)	-	Customization
Fiber Type for Output (Signal Channel)	-	20/400 DCF NA 0.065
Min. Pump Efficiency	%	97
Max. Input Pump Power	W	6 × 500
Package Dimensions	mm	Pump Power < 3 kW: 150 (L) × 15 (W) × 10 (H) Pump Power ≥ 3 kW: 180 (L) × 15 (W) × 11 (H)

Parameters for FBG (HR)	Unit	Value
Fiber Type	-	20/400 DCF NA 0.065
Peak Reflectivity	%	≥ 99.0
Reflection Bandwidth at 95%	nm	1.5 - 4.0
Tolerance on Reflection Bandwidth	nm	0.1 - 0.4
Min. Side Mode Suppression Ratio	dB	20
Max. Wavelength Mismatch (OC Relative HR)	nm	0.3

¹Test with 1064 nm light source.



ClearCut Raman Scattering Suppression FBG

Parameter	Unit	Value			
Passband Center Wavelength	nm	1080			
RSS Wavelength	nm	1132 ± 10			
Max. Insertion Loss (Passband Center Wavelength)	dB	0.2			
Min. Attenuation (RSS Wavelength)	dB	20			
Min. Return Loss (RSS Wavelength)	dB	25			
Fiber Core Dimension	µm	10	14	20	25
Max. Core Signal Power Handling	W	300	2000	3000	4000
Max. Core RSS Power Handling	W	3	20	30	40
Fiber Clad Dimension	W	125	250	400	
Max. Clad Pump Power Handling	W	300	2000	3000	
Package Dimensions	mm	80 (L) × 12 (W) × 5 (H)			
Storage Temperature	°C	- 40 to + 85			



ClearCut 2 µm Series Fiber Bragg Grating

Parameter	Unit	Value		
Center Wavelength	nm	1900 - 2100		
Tolerance on Center Wavelength	nm	± 1		
Max. Wavelength Mismatch (OC Relative HR)	nm	0.2		
High Reflector (HR) / Output Coupler (OC)	-	HR	OC	
Peak Reflectivity	%	≥ 99.0	(5.0 - 30.0) ± 2.0	
Reflection Bandwidth at 95%	nm	1.5 - 3.0	-	
Reflection Bandwidth at 50%	nm	-	0.5 - 1.0	
Tolerance on Reflection Bandwidth	nm	0.1 - 0.3	0.1	
Min. Side Mode Suppression Ratio	dB	-	10	
Fiber Core/Cladding Dimension	µm	10/130	15/250	25/400
Max. Core Signal Power Handling	W	50	100	150
Max. Clad Pump Power Handling	W	150	300	450
Package Dimensions	mm	60 (L) × 12 (W) × 5 (H)		
Cooling Bottom Plate Temperature	°C	≤ 25		
Storage Temperature	°C	- 40 to + 85		



D1 Laser Cable

Parameter	Unit	Value
Operating Wavelength	nm	900 - 1100
Fiber Core Diameter	µm	20 - 400
Numerical Aperture (NA)	-	≤ 0.22
Max. Transmission Loss	%	2
Max. Power Handling	W	1000, 2000, 3000, 6000 or Specify
Max. Stripping Cladding Power	W	500
Backward Power Handling	W	500
Max. Z-Position Tolerance	µm	50
Fiber Concentricity	µm	≤ 50
Max. Angular Deviation	mrad	20
Cooling Water Requirements		
Flow Rate	L/min	1.5 - 3.0
Max. Water Pressure	MPa	0.8
Water Temperature	°C	10 - 25
Water pH Value	-	5.6 - 7.9
Water Hose Diameter	mm	ID/OD = 4/6
Others		
Mechanical Interface	-	Compatible with the Standard QBH Interface
Armoured Cable Diameter	mm	13.3
Storage Temperature	°C	- 20 to + 70



D2/D3 Laser Cable

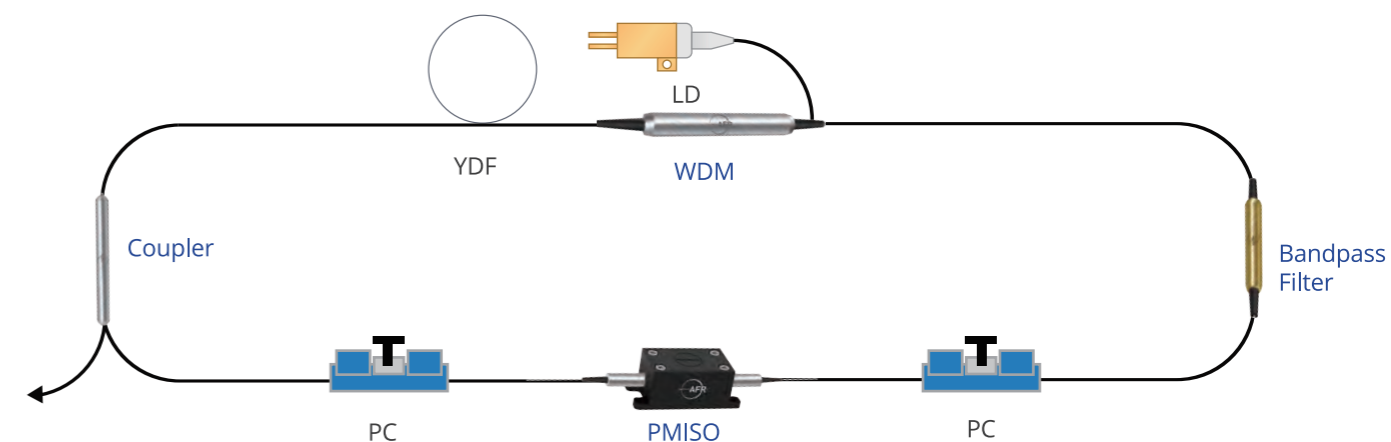
Parameter	Unit	Value
Operating Wavelength	nm	1080
Fiber Core Diameter	μm	100, 150, 200 or Specified
Numerical Aperture (NA)	-	0.22
Max. Transmission Loss	%	2
Max. Power Handling	kW	10 - 30
Max. Stripping Cladding Power	W	500
Backward Power Handling	W	500
Max. Z-Position Tolerance	μm	50
Fiber Concentricity	μm	≤ 50
Max. Angular Deviation	mrad	20

Cooling Water Requirements

Min. Flow Rate	L/min	3.0
Min. Water Pressure	MPa	0.8
Water Temperature	°C	+ 10 to + 25
Water pH Value	-	5.6 - 7.9
Water Hose Diameter	mm	ID/OD = 6/8

Others

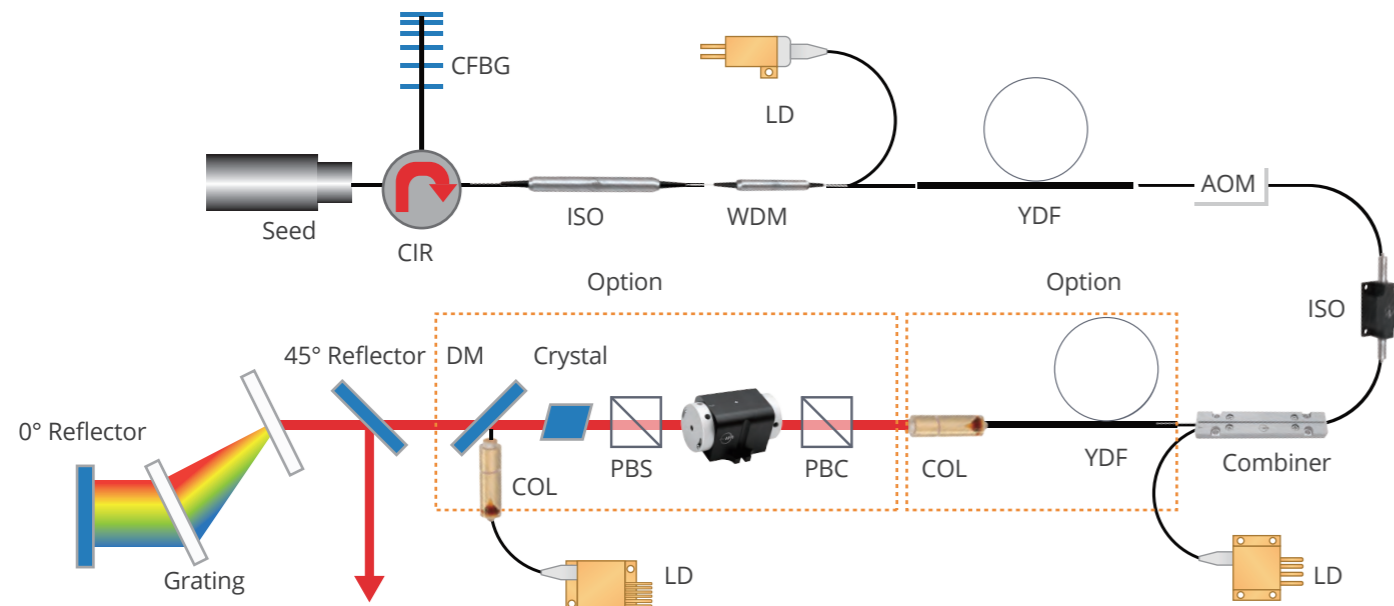
Mechanical Interface	-	Compatible with the Standard Q+/QD Interface
Armoured Cable Diameter	mm	13.3
Min. Cable Bend Radius	mm	200
Storage Temperature	°C	- 20 to + 70



AFR 1030/1064 nm Low Power Polarization Maintaining Components for Ultra-Fast Lasers

- WDM
- Bandpass Filter
- In-Line Isolator
- Collimator
- Splitter
- Fiber Bragg Grating Reflector
- Package Ability for SESAM





AFR 1030/1064 nm Polarization Maintaining Components for Ultra-Fast Lasers

- 300 mW - 30 W In-Line Isolator
- 200 W Free Space Isolator
- 300 mW - 30 W Circulator
- 200 W Collimator
- 5 - 10 W WDM
- 200 W Pump Combiner
- Chirped Fiber Bragg Gratings
- Components with Active Fiber

We can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.

ClearCut Dispersion Management Reflector for Ultrafast Laser

Parameter	Unit	Value
¹ Center Wavelength	nm	1030
Tolerance on Center Wavelength	nm	3
² Dispersion Parameter (D _c)	ps/nm	0.2 0.42
Peak Reflectivity	%	5 - 15 5 - 20
Reflection Bandwidth (FWHM)	nm	≥ 20
Tolerance on Reflection Bandwidth	nm	2
Spectral Shape	-	Gauss
Fiber Type	-	PM 980
Package Dimensions	mm	Recoated
Storage Temperature	°C	- 40 to + 85

¹Center wavelength could range from 1020 nm to 1040 nm.
²The dispersion parameter and fiber type could be customized.



ClearCut Fiber Bragg Gratings Reflector

Parameter	Unit	Value
Center Wavelength	nm	1030.0, 1064.3
Tolerance on Center Wavelength	nm	0.1
Peak Reflectivity	%	5 - 99
¹ Reflection Bandwidth (FWHM)	nm	0.2 - 0.7
Tolerance on Reflection Bandwidth	nm	0.1
Min. Core Signal Power Handling	mW	500
² Fiber Type	-	PM 980, PM 1060, PM 10/125
Package Dimensions	mm	Recoated
Storage Temperature	°C	- 40 to + 85

¹The FWHM depends on the peak reflectivity.
²The fiber type could be customized.



FEATURED PRODUCTS FOR ULTRA-FAST LASERS

ClearCut Chirped Fiber Bragg Gratings

Parameter	Unit	Value	
¹ Center Wavelength	nm	1030	
Tolerance on Center Wavelength	nm	1	
¹ Dispersion Parameter (D_2)	ps/nm	> 100	10.3
Peak Reflectivity	%	≥ 40	≥ 40
Reflection Bandwidth (FWHM)	nm	1 – 10	1 – 15
Tolerance on Reflection Bandwidth	nm	1	1
Dispersion Tunable	-	YES	NO
Tolerance on D_2 Parameter	ps/nm	5	/
¹ β_3 Parameter	ps ³	- 0.069	/
² Fiber Type	-	PM 980	
³ Operating Temperature	°C	+ 25 to + 40	
Storage Temperature	°C	- 40 to + 85	
Package Dimensions for Dispersion Tunable	mm ³	182 × 30 × 18 (CFBG Module)	
Production		130 × 56 × 155 (Adapter)	



¹Parameter will deviate if temperature changed.

²Fiber type could be customized.

³The range of temperature could be modified in practical.

LaseGuard Free Space Isolator Series

Parameter	Unit	Value
Center Wavelength (λ_c)	nm	1060 or Specified
Peak Transmission (λ_c , 23 °C)	%	> 95
Peak Isolation (λ_c , 23 °C)	dB	> 35
Input Polarization	-	Specified
Output Polarization	-	Specified
Clear Aperture	mm	5 or Specified
Optical Average Power	W	100 or Specified
Damage Threshold	-	10 J/cm ² @ 10 ns 1 J/cm ² @ 8 ps
Operating Temperature	°C	+ 10 to + 30
Storage Temperature	°C	0 to + 60



Brochure version: APR, 2024

Every effort has been made to ensure the accuracy of the information contained in this catalog at the time of publication. As part of our policy of continuous product improvement, we reserve the right to change specifications at any time. For the most up-to-date information, please refer to our website.

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