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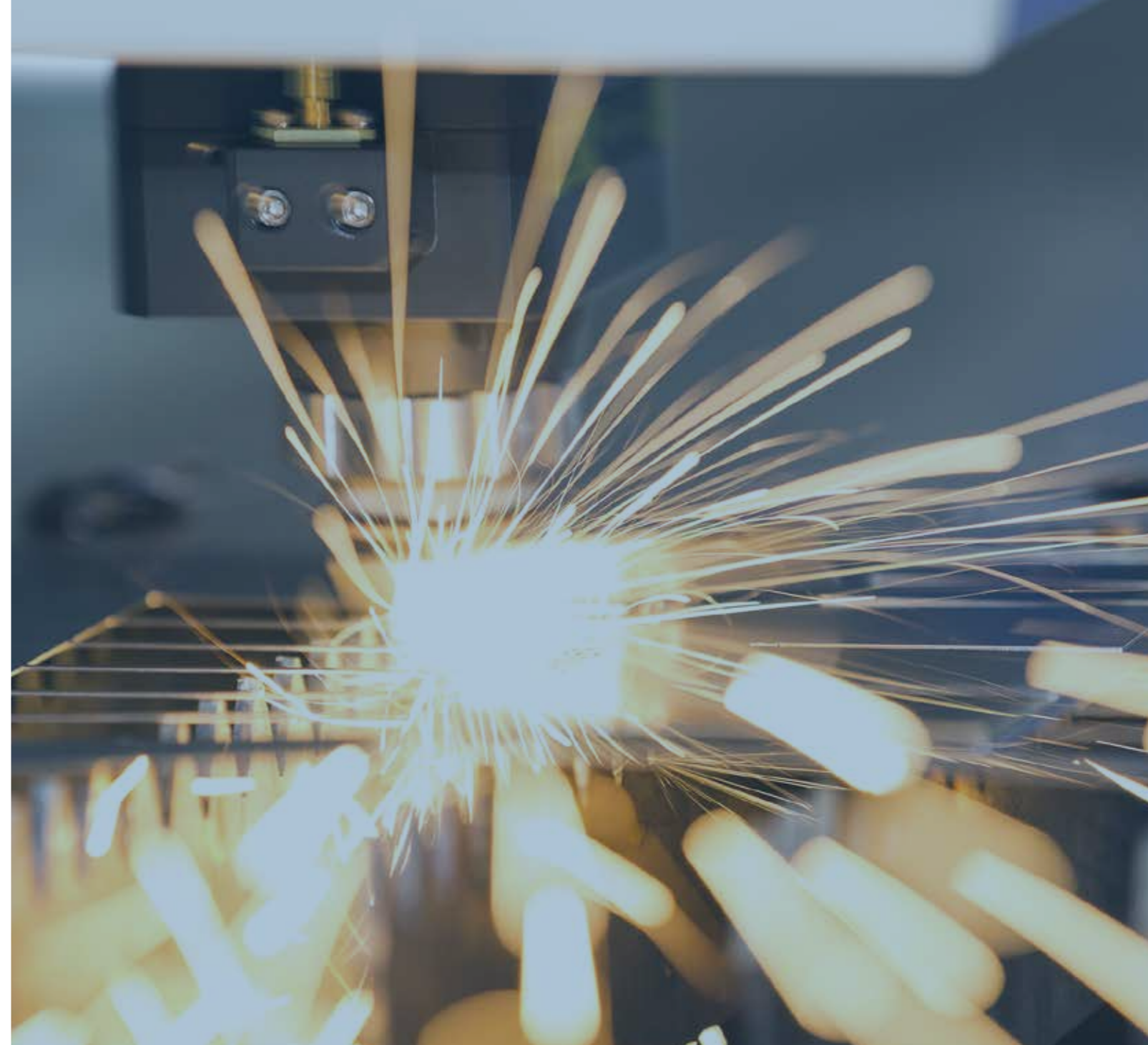
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Stock Code:300747

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Product Manual



核心光源 锐科制造  
Reshape Fiber Lasers

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# Raycus Introduction

Raycus

# 2021



## Company Profile

Wuhan Raycus Fiber Laser Technologies Co., Ltd. (hereinafter referred to as "Raycus", stock code: 300747.SZ) is a high-tech enterprise, the key project of China Torch Program, specializing in R&D, production and sales of fiber lasers and its key components and materials, with a national key field innovation team for high-power fiber lasers and local joint engineering research center for fiber laser technology, and it is the R&D, production and service provider with global influence for fiber lasers vertically integrating materials, devices and complete machines. The company shall provide various types of fiber laser products and application solutions for laser manufacturing equipment integrators, and provide technical research and development services and customized products as its main businesses.

# Development History

## 2007

Wuhan Raycus Fiber Laser Technologies Co., Ltd was established, breaks the blockade and price monopoly of Chinese fiber lasers relying on foreign technology and fills the domestic gap.

## 2008

Raycus launched the 10W pulsed all-fiber laser and undertook the national S&T support program and special national key projects

## 2009

Raycus launched the 100W CW fiber laser

## 2010

Raycus'25W pulsed fiber laser product was selected as a national key new product

## 2011

500-1,000W CW fiber laser was developed successfully and put into mass production

## 2012

4000W CW fiber laser passed the appraisal of S&T achievements.

President Hu Jintao granted an interview to Dr. Yan Dapeng from Raycus during his visit to Optics Valley

## 2013

President Xi Jinping granted an interview to Dr. Yan Dapeng, the vice-president and chief engineer of Raycus, during his visit to Optics Valley, Wuhan

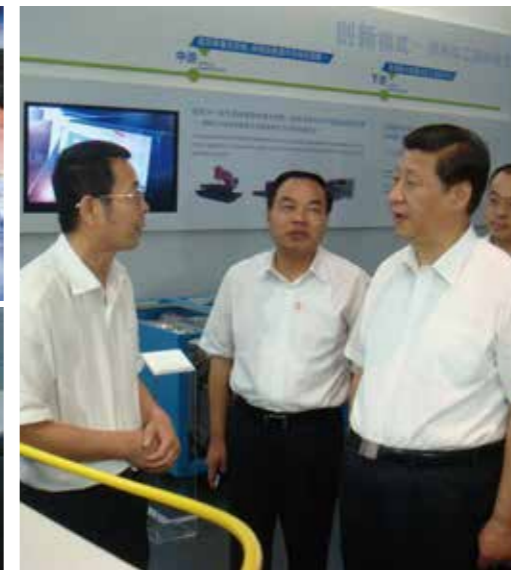
The first 10,000W CW fiber laser of China was developed successfully with the core technology of 10,000w fiber laser

## 2014

Raycus 'patent for invention won the Excellence Award of the 16th China Patent

Raycus completed its shareholding reform and changed its name to Wuhan Raycus Fiber Laser Technologies Co., Ltd.

## 2015



# 2007-2021

# Development History

## 2016

The JB/T12632-2016 Fiber Laser drafted by Raycus was released officially as the first fiber laser industry standard of China.

## 2017

The topic of "High-Efficiency High-Power Fiber Laser", the National 863 Program initiated by Raycus passed the technical acceptance

## 2018

Raycus (stock code: 300747.SZ) was officially listed on the stock market

The R&D project of 20kW fiber laser and its core device passed the acceptance.

## 2019

Dr. Yan Dapeng, deputy to the National People's Congress and vice president of Raycus Laser, showed the company's products to Premier Li Keqiang

Acquired 51% equity of Gauss Laser, expanded the technical research of ultrafast lasers.

Wuxi Raycus Fiber Laser Technology Co., Ltd. was established, striving to build a R & D, production, testing and application technology center for pulsed fiber lasers and fiber delivered direct diode lasers.

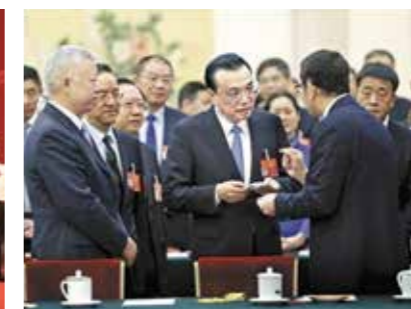
## 2020

Raycus participated in the formulation of the "industrial fiber laser parameter requirements and test methods" standard, which has officially become the international standard for this category.

Raycus is on the list of 2020 National Innovation Demonstration Enterprises.

Han Zheng, member of the Standing Committee of the Political Bureau of the Central Committee of the Communist Party of China and vice premier of the National Academy, investigated enterprises in the Donghu High-tech Zone and listened to a report by Raycus Yan Dapeng.

Ying Yong, members of Hubei Provincial Party Committee Secretary investigated the enterprises in the East Lake High-tech Zone and Yan Dapeng reported how Raycus helped Hubei Province win the battle against the epidemic.



# 2007-2021



Core Competitiveness

## Brand Advantages

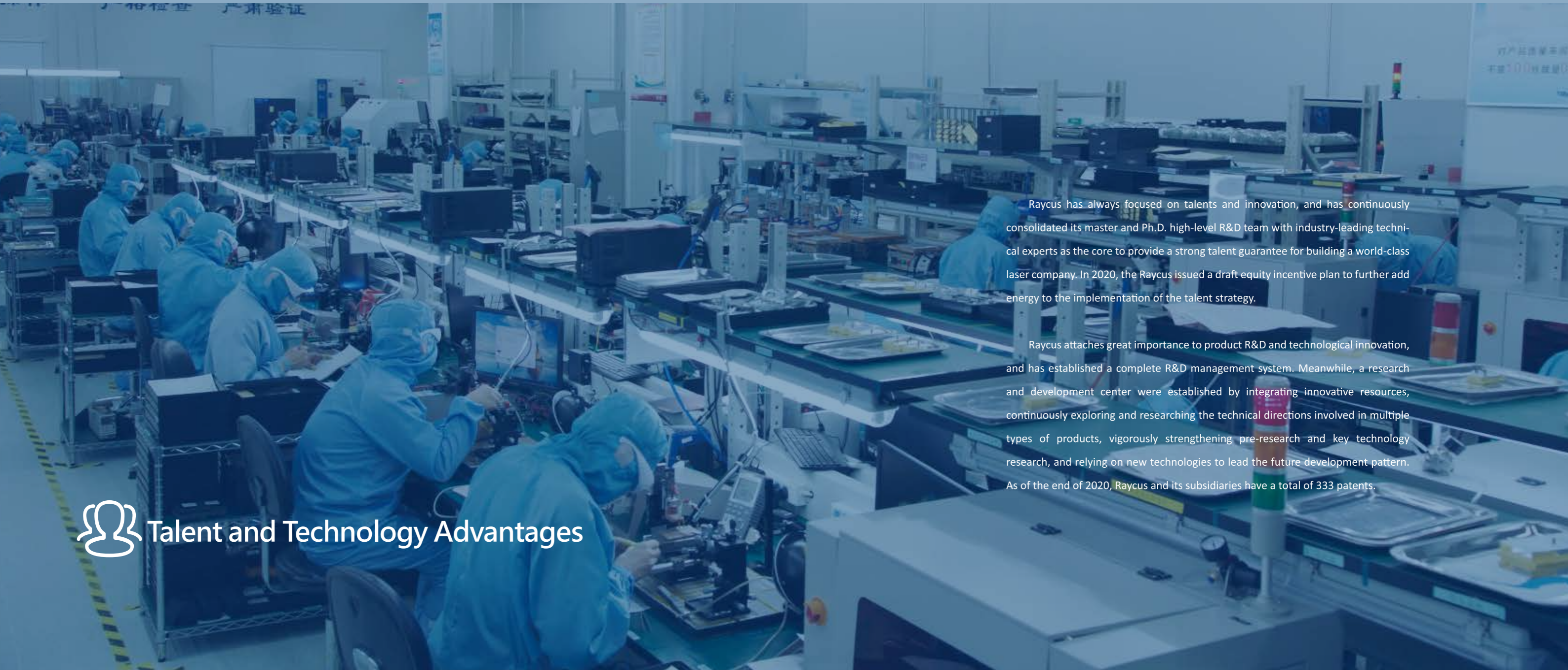
Raycus is a leading enterprise in domestic fiber lasers. As the first domestic listed company with lasers as its main business, in 2016, it took the lead in formulating my country's first fiber laser industry standard JB/T12632-2016 "Fiber Laser". The company has won many honors by virtue of its excellent R&D strength and outstanding innovation ability, and has built a high brand awareness. In 2020, Raycus Laser participated in the formulation of China's first international standard for laser products "industrial fiber laser parameter requirements and test methods", further enhancing the company's domestic and even global influence.

Raycus continues to innovate and make breakthroughs, and its technical research and development strength has always maintained a leading level in the domestic industry. With the gradual improvement of the company's product line and the continuous improvement of product quality, downstream customers' recognition of the Raycus brand continues to increase.



**Raycus**

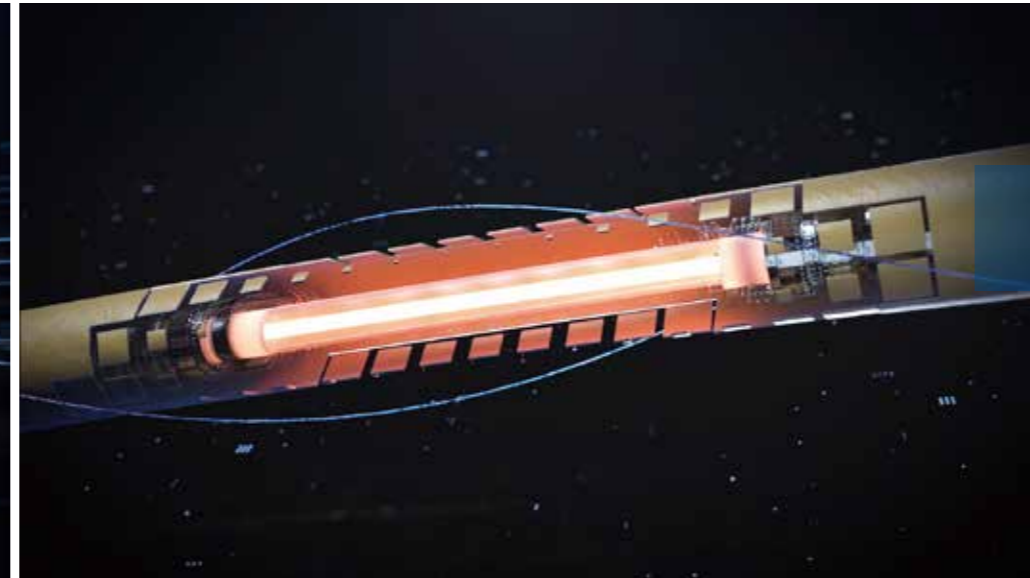
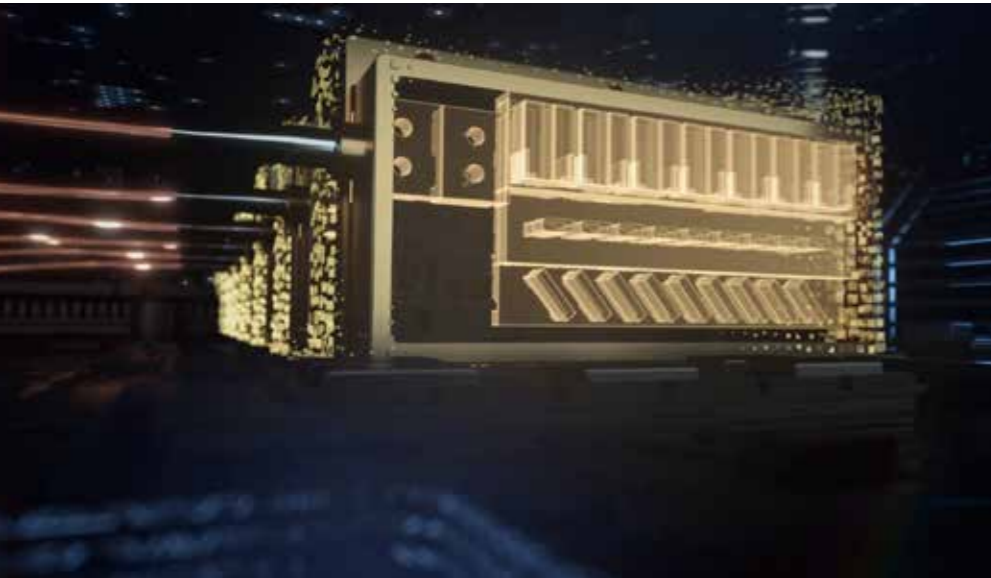




Raycus has always focused on talents and innovation, and has continuously consolidated its master and Ph.D. high-level R&D team with industry-leading technical experts as the core to provide a strong talent guarantee for building a world-class laser company. In 2020, the Raycus issued a draft equity incentive plan to further add energy to the implementation of the talent strategy.

Raycus attaches great importance to product R&D and technological innovation, and has established a complete R&D management system. Meanwhile, a research and development center were established by integrating innovative resources, continuously exploring and researching the technical directions involved in multiple types of products, vigorously strengthening pre-research and key technology research, and relying on new technologies to lead the future development pattern. As of the end of 2020, Raycus and its subsidiaries have a total of 333 patents.

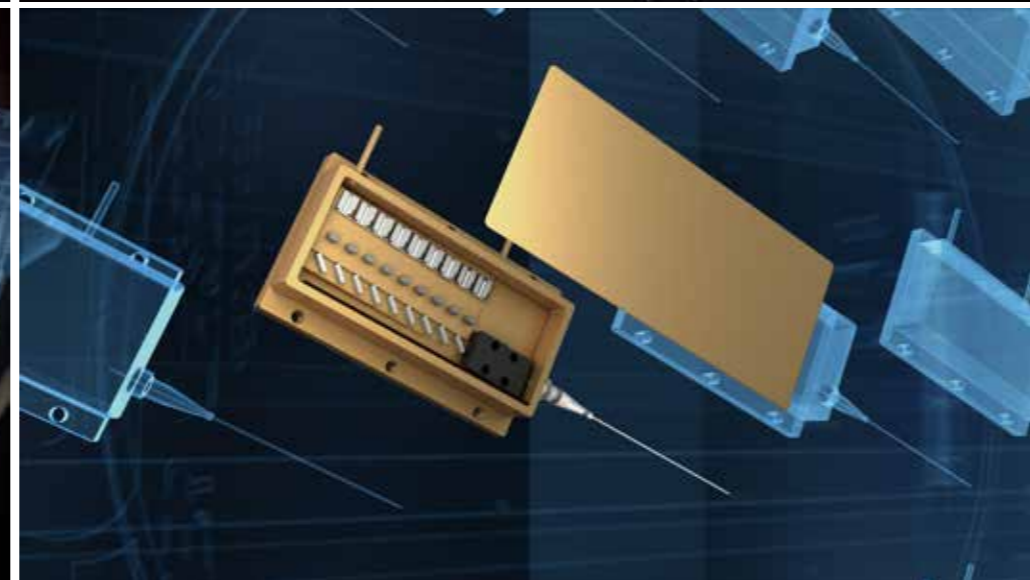
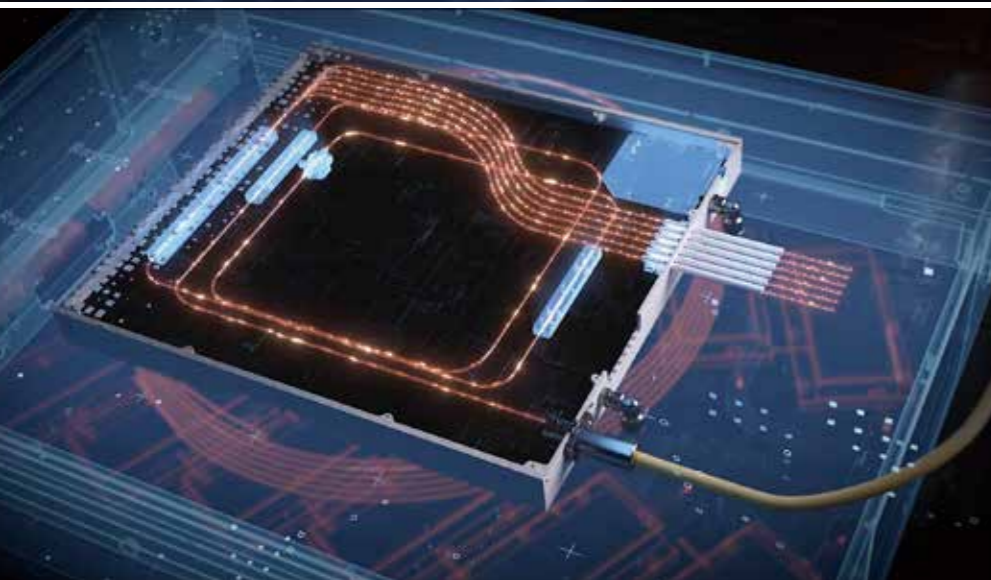
 Talent and Technology Advantages



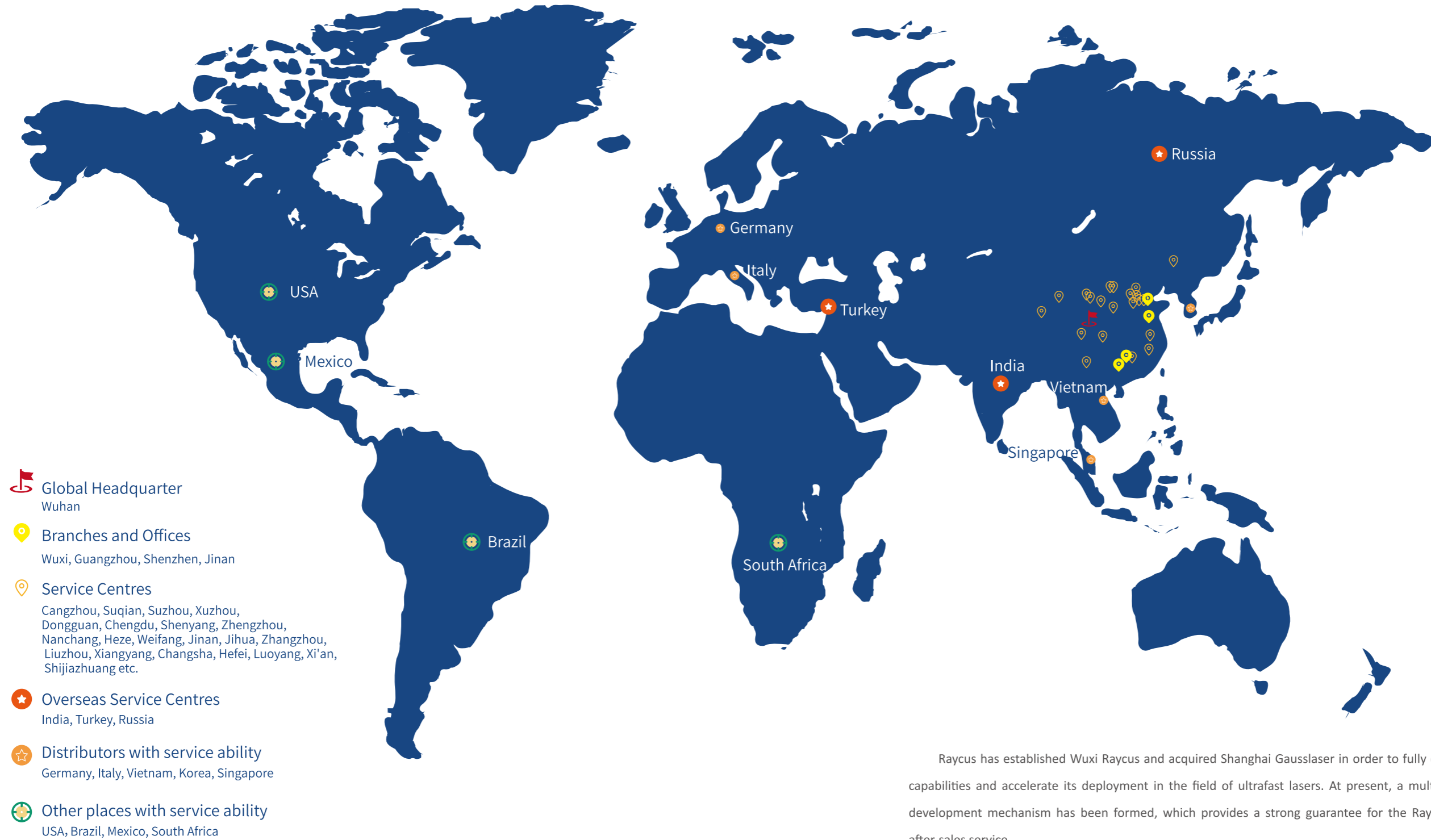
## Industrial Chain Vertical Integration and Intelligent Manufacturing Advantages

Raycus has mastered the key technologies and mass production capabilities of core devices and materials through independent research and development, technological innovation and industrial mergers and acquisitions. Through the vertical integration of the upstream industrial chain of fiber lasers and the establishment of a manufacturing center, Raycus comprehensive competitiveness has also grown rapidly.

In 2020, Raycus will actively organize the implementation of management system standards, deepen the implementation of smart manufacturing strategies, increase the implementation of automation upgrades and special projects to reduce costs and increase efficiency, and continue to improve the reliability of core components and the rate of self-manufacturing.



## Marketing and After-sales Service Advantages



Raycus has established Wuxi Raycus and acquired Shanghai Gausslaser in order to fully enhance its industrialization capabilities and accelerate its deployment in the field of ultrafast lasers. At present, a multi-regional linkage industrial development mechanism has been formed, which provides a strong guarantee for the Raycus national marketing and after-sales service.

As of the end of 2020, Raycus has served more than 1,600 customers. Raycus has a strong sales and technical support service team, which quickly summarizes, analyzes, and resolves the problems encountered by customers. Meanwhile, Raycus also focus on strengthening the overseas service layout and creating a global service system.



Products and Application

# Raycus' laser, your core power

Q-switched Pulsed Fiber Lasers   MOPA Fiber Lasers   High Power Pulsed Fiber Lasers   Single Module CW Fiber Lasers  
CW Fiber Lasers For Welding   Multi-module CW Fiber Lasers   QCW Fiber Lasers   Fiber Delivered Direct Diode Lasers  
Adjustable Beam Profile Fiber Laser   High Power Fiber Laser with Shutter   Fiber Delivered Direct Diode Blue Laser

## Good-looking

Compact size  
Lighter weight

## High intelligence

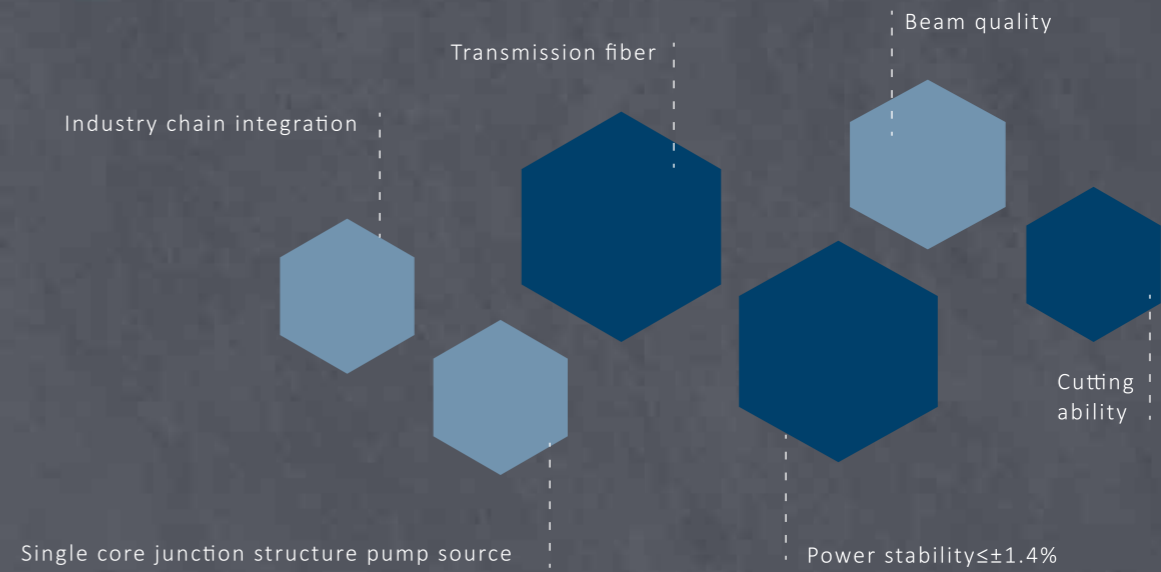
Intelligent management software  
Intelligent after-sales service function  
easy to use  
Sophisticated workmanship  
Easy to customize  
Remote operation and maintenance platform

## High performance

New active optical fiber  
New pump packaging technology  
New QD transmission optical cable  
New combining and mode control technology

## High reliability

Active dehumidification,  
3-level temperature monitoring  
Double emergency safety protection  
Waterproof, dustproof and rustproof



Standard protective lens

### QBH quartz crystal protection lens

The domestic production environment is relatively rough, and it is easy to pollute the transmission fiber head. It is equipped with a protective window and provides free replacement service for the first pollution burn

Further protection

### QBH quartz crystal protection lens

2 years warranty  
Raycus reserves redundant power in the laser to ensure that any attenuation of the laser within 2 years can be restored to the factory state



# Q-Switched Pulsed Fiber Lasers

## Introduction

The 20-100W Q-Switched Pulsed Fiber Laser Series developed by Raycus is the industrial marking and micromachining laser. This series pulsed laser has high peak power, high single-pulse energy and optional spot diameter and can be widely applied in the fields, such as marking, precision processing, graphic engraving of non-metal, gold, silver, copper and aluminum with altitude stress resistance, stainless materials without altitude stress resistance. Its marking process features lower cost and more stable performance compared with traditional laser.



## Characteristic

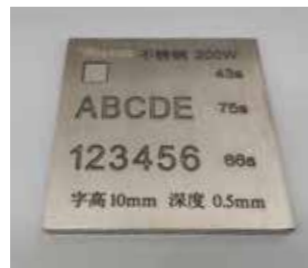
- Highly stable laser output
- High single-pulse energy
- High marking efficiency
- Short pulse setup time
- High reliability
- Maintenance-free operation

## Application

- |                             |                       |                   |
|-----------------------------|-----------------------|-------------------|
| Marking                     | Texturing             | Cleaning          |
| Material Processing         | Metal Drawing         | Deep Carving      |
| ITO Film Etching            | Silicon Processing    | Precision Welding |
| Metal Film Cutting&Piercing | Resistance Adjustment |                   |



Deep carving



Marking



Brass deep carving



Precision punching

## Specifications

Model	RFL-P20QE	RFL-P20QS	RFL-P30QS	RFL-P30Q	RFL-P50QB	RFL-60Q	RFL-P100Q
<b>Optical Properties</b>							
Average Output Power(W)	20	20	30	30	50	60	100
Central Wavelength(nm)	1064					1064±5	1064
Repetition Frequency Range (kHz)	30-60	30-60	40-60	30-60	50-100	10-100	20-200
Output Power Stability (%)	<3%						<5%
<b>Output Characteristics</b>							
Output Beam Diameter(mm)	7±1					6~8	6.5±1
M <sup>2</sup>	<1.5		<1.6			≤1.6	<1.6
Polarization State	Random						
Pulse Width (ns)	120-150		130-160	120-150			50-110
Max.Single Pulse Energy(mJ)	0.67		0.75	1		1.09	1
Delivery Cable Length(m)	3 (Customizable)						
<b>Electrical Characteristics</b>							
Power Supply (V DC)	24						
Power Range (%)	10~100						0~100
<b>Other Characteristics</b>							
Dimensions(mm) width*height*depth	260×340×120	215×290×95		260×340×120		340×260×95	360×390×123
Cooling	Air-cooled						
Operating Temperature(°C)	0-40						

# MOPA Fiber Lasers

## Introduction

The brand-new MOPA fiber laser launched by Raycus has a variety of pulse width options, including high average power (20-200W), high-peak power ( $\leq 15\text{kW}$ ) and 2-500ns variety of pulse width, adjustable repetition frequencies of 1-2000kHz, available first pulse, CW mode customizable, online modifiable pulse width and other characteristics. It is ideal for industrial applications in the field of solar photovoltaic, thin film cutting, sheet material cutting, welding, surface cleaning of materials, fine marking and material deepening, etc



## Application

- Film Cutting
- Precision Cleaning
- Anodic Aluminum Etching
- Surface Heat
- Colorful Marking
- Texturing Treatment
- Precision Marking

## Characteristic

- Uniform Control Interface
- Wide Modulation Frequency Range
- Variety of Pulse width
- Customize Pulse Width
- Available first pulse
- High Beam Quality
- Air Cooling System



Color marking



Stainless steel color marking



Film cutting



Precision welding

## Specifications

Model	RFL-P20MX	RFL-P30MX	RFL-P70MX	RFL-P70M	RFL-P100M	RFL-P200S
<b>Optical Properties</b>						
Nominal Output Power(W)	20	30	70	70	100	200
Central Wavelength(nm)	1064±5					
Repetition Frequency Range (kHz)	1-2000		20-1000		20-2000	
Output Power Stability (%)	<5%	≤5%		<5%		
<b>Output Characteristics</b>						
Output Beam Diameter (mm)	7±1		6.5±1		5.5-8	
M <sup>2</sup>	<1.5	≤1.6		<1.6	<1.8	
Polarization State	Random					
Pulse Width (ns)	2-500 (Customizable)	2-500	10-350 (Customizable)	10-350(Customizable)		10-240 (Customizable)
Max. Single Pulse Ener(mJ)	0.71	/	/	1.0		
Delivery Cable Length(m)	3 (Customizable)					
<b>Electrical Characteristics</b>						
Power Supply (V DC)	24	24±1		24		
Power Range (%)	0~100		10-100	0~100		
<b>Other Characteristics</b>						
Dimensions (mm) width*height*depth	286×215×95		350×320×120	360×390×123	360×390×123	400×460×121
Cooling	Air-cooled					
Operating Temperature (°C)	0-40					

# High-power Pulsed Fiber Lasers



## Introduction

High-power pulsed fiber lasers series is the latest product developed by Raycus. It has average output of (200-2000W), high single pulse energy, uniform square or circular spot energy distribution, easy to use and maintain. They are the ideal products for mold surface treatment, automobile manufacture, shipping industry, petrochemical industry and tire manufacture, etc.

## Application

- Rust Removal
- Mold Surface Treatment
- Welding Surface Pre-treatment
- Oil Cleaning
- Paint Stripping
- Portrait Stone Surface Treatment

## Characteristic

- Uniform Control Interface
- Adjustable Frequency Range
- High Single Pulse Energy
- Excellent Light Beam Quality



Laser cleaning



Mold cleaning

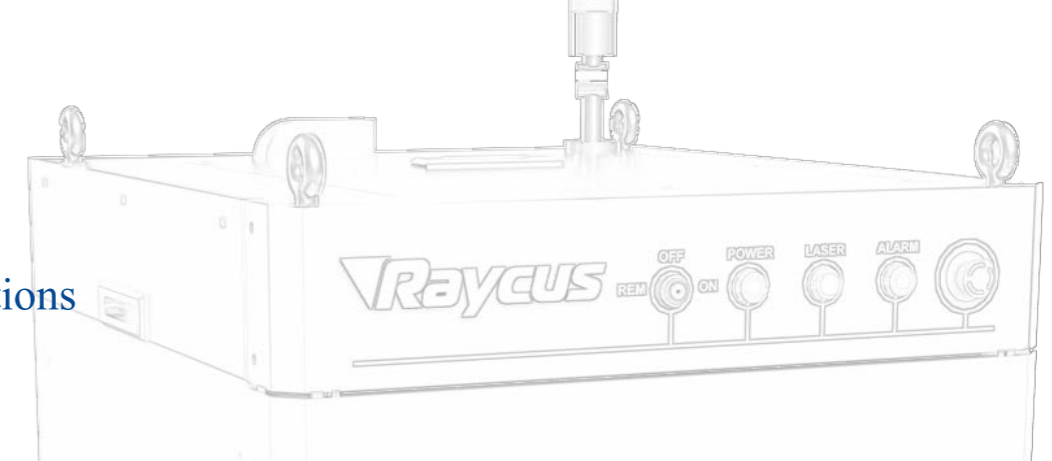


Cleaning after welding



Wheelset cleaning

## Specifications



Model	RFL-P200	RFL-P300	RFL-P500	RFL-P1000	RFL-P2000
<b>Optical Properties</b>					
Output Power (W)	100@10kHz	250@20kHz	200@10kHz	400@10kHz	2000@20-50kHz
	200@20-50kHz	300@30-50kHz	500@20-50kHz	1000@20-50kHz	
Wavelength(nm)	1064±5				
Repetition Frequency (kHz)	10-50	20-50	10-50	10-50	20-50
Output Power Stability (%)	<5%				
<b>Output Characteristics</b>					
Polarization State	Random				
Pulse Width Range(ns)	90-130	120-160	90-160	90-160	120-160
Max.Single Pulse Energy(mJ)	10@20 kHz	12.5@20 kHz	25@20kHz	50@20kHz	100@20kHz
Output Fiber Inner Diameter (um)	100	100	200	400	400/600
Delivery Cable Length(m)	5 (Customizable)		10	15	20
<b>Electrical Characteristics</b>					
Power Supply (V AC)	220VAC 50/60Hz				Three phase 380 50/60Hz
Power Range(%)	10~100				10~100
<b>Other Characteristics</b>					
Dimensions (mm) width*height *depth	485×237×765		502×254×755	698×898×865	1018×836×850
Cooling	Water Cooling				
Operating Temperature (°C)	10-40				



# Single Module CW Fiber Lasers

## Introduction

The third-generation single module CW fiber laser series developed by Raycus ranges from 300W to 3,000W, the new lasers have higher electro-optical conversion efficiency, higher and more stable optical quality, stronger altitude stress-resisting capacity and they apply optimized second-generation fiber transmission system to ensure more stable and more sophisticated cutting effect in thick sheet cutting. This series of lasers apply to many application scenarios: cutting, welding, holing, medical device processing, etc., with a narrow seam of the cut sheet and bright section.



## Characteristic

- High Electro-optical Conversion Efficiency
- Altitude Stress-resisting Capacity
- Sheet Cutting Efficiency
- Customized Output Fiber Length
- Maintenance-free Operation
- Wide Modulation Frequency Range

## Application

- Precision Cutting
- Sheet Metal Piercing
- Metal Carving
- Metal Welding
- Surface Treatment
- 3D Printing/Rapid Prototyping



Lithium battery welding



3D printing



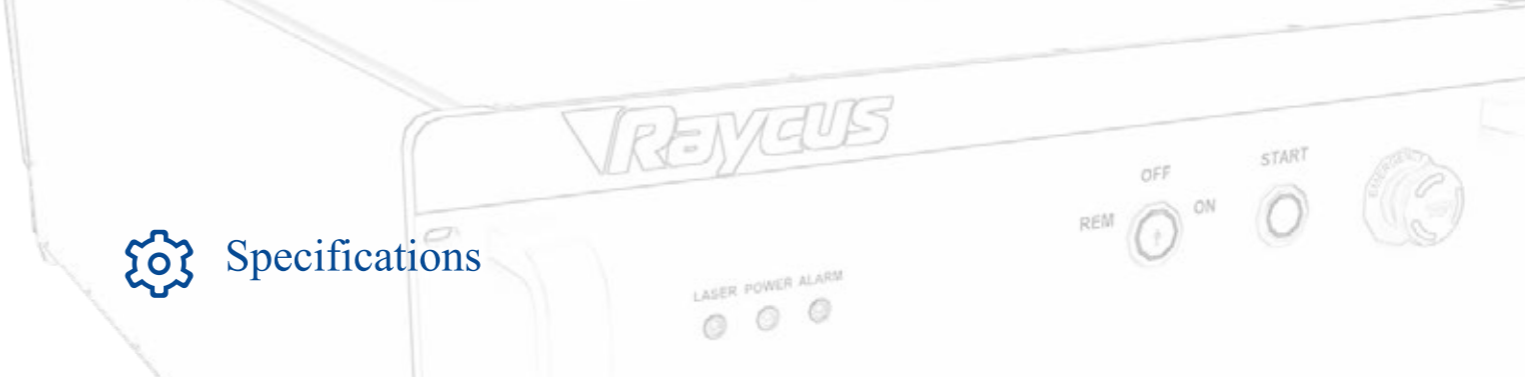
20mm carbon steel cutting



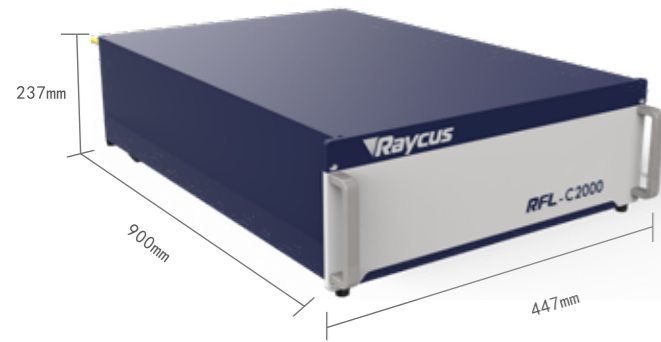
Brass cutting

## Specifications

Model	RFL-C300L	RFL-C500	RFL-C750	RFL-C1000	RFL-C1500X	RFL-C2000X	RFL-C3000S
<b>Optical Properties</b>							
Average Output Power(W)	250	500	750	1000	1500	2000	3000
Central Wavelength(nm)	1080±5						
Operation Mode	CW/Modulate						
Max. Modulation Frequency(kHz)	20			5			
Output Power Stability (%)	±1.5						
Red Laser	Yes						
<b>Output Characteristics</b>							
Beam Delivery Optics	QBH (Customizable)						
Beam Quality(M <sup>2</sup> )	1.1 (25μm)		1.3 (25μm)		5-7 (50μm)		
Polarization State	Random						
Delivery Cable Length(m)	15 (Customizable)			20 (Customizable)			
<b>Electrical Characteristics</b>							
Power Supply (V AC)	200-240, Single Phase				Three Phase-four Wire Connect 380±10%		
Control Mode	RS232/ AD/Super Terminal				RS232/ AD		
Power Range(%)	10~100						
<b>Other Characteristics</b>							
Dimensions (mm) width*height*depth	485×748×237 (handle included)				485×900×237 (handle included)		
Weight(kg)	<50			<80		<85	
Cooling	Water Cooling						
Operating Temperature(°C)	10-40						



# CW Fiber Lasers For Welding



## Characteristic

- Features
- Excellent beam quality
- High reliability
- High power stability
- High modulation frequency
- Continuously adjustable power, fast switching response
- Maintenance-free operation
- High electro-optical conversion efficiency

Model	RFL-C1000H	RFL-C1500H	RFL-C2000H
<b>Optical Properties</b>			
Average Output Power(W)	1000	1500	2000
Operation Mode	CW/Modulate		
Polarization direction	Random		
Power Adjusting Range(%)	10~100		
Central Wavelength(nm)	1080±5		
Output Power unStability(%)	±1.5		
Modulation Frequency(Hz)	50~20,000	1~5,000	
Red Light Indicated Power (mW)	0.1~1	0.5~1	
<b>IQB optical output characteristics</b>			
BPP (mm.mrad)	<1.5		
Beam Divergence (rad)	≤0.06	<0.06	
Fiber core (μm)	50 (100,200 Optional)	50	
Delivery Cable Length(m)	10		
<b>Electrical Characteristics</b>			
Operation Voltage(V AC)	220±10% V AC、50/60Hz	380±10% V AC、50/60Hz	
Control Method	RS-232/AD/Ethernet		
<b>Other Characteristics</b>			
Dimensions (mm) width*height*depth	410×405×150 (Handle Included)	410×610×150 (Handle Included)	900×447×237 (Handle Included)
Weight(kg)	<25	<40	<70
Cooling	Water cooling		
Operating Temperature (°C)	10-40		



Stitch welding



Tailor welding



Vertical welding



Stitch welding

# 4000W-8000W Multi-module CW Fiber Lasers

## Introduction

The Multi-module CW Fiber Lasers developed by Raycus ranges from 4,000W to 30kW, with high electro-optical conversion efficiency, high light beam quality, high energy density, wide modulation frequency, high reliability, long service life, maintenance-free operation and advantages. The product can be widely applied in welding, precision cutting, melting and cladding, surface processing, 3D printing and other fields. Its optical output performance helps it better integrate with robots as a flexible manufacturing equipment to meet 3D processing requirement.

## Application

- Cutting
- Welding
- Sintering
- Cladding
- Surface Treatment
- 3D Printing

## Characteristic

- High Electro-optical Conversion Efficiency
- Customized Output Fiber Length
- Output Cable: QBH/QD
- Maintenance-free Operation
- Wide Modulation Frequency Range
- Small Size, Easy to Install



Model	RFL-C4000X	RFL-C6000X	RFL-C8000X
<b>Optical Properties</b>			
Average Output Power(W)	4000	6000	8000
Wavelength(nm)	1080±5		
Operation Mode	CW/Modulate		
Max. Modulation Frequency(kHz)	2		
Output Power Stability(%)	±1.5		
Red Laser	Yes (Output Power 0.5mW~1mW)		
<b>Output Characteristics</b>			
Beam Delivery Optics	QBH (Customizable)	QD	
Output Fiber Diameter(μm)	100 (Customizable)		
BPP(mm.mrad)	≤4		
Polarization State	Random		
Delivery Cable Length (m)	20(Customizable)	≤30	
<b>Electrical Characteristics</b>			
Power Supply (VAC)	323~437, Three Phase-four Wire Connect, @47-63Hz		
Control Mode	RS232/AD		
Power range (%)	10~100		
<b>Other Characteristics</b>			
Dimensions (mm) width*height*depth	670×990×1160	900×960×1160	
Cooling	Water cooling		
Operating Temperature (°C)	10~40 (°C)		



welding



welding



25mm stainless steel cutting

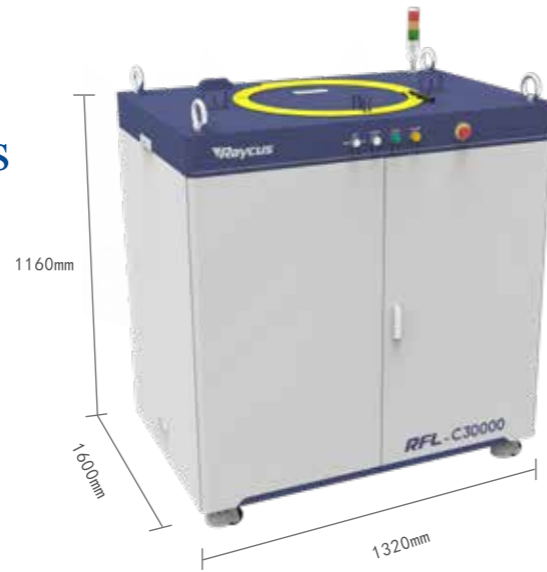


Carbon steel bright surface cutting

# 10000W-30000W Multi-module CW Fiber Lasers

## Introduction

The Multi-module CW Fiber Lasers developed by Raycus ranges from 4,000W to 30kW, with high electro-optical conversion efficiency, high light beam quality, high energy density, wide modulation frequency, high reliability, long service life, maintenance-free operation and advantages. The product can be widely applied in welding, precision cutting, melting and cladding, surface processing, 3D printing and other fields. Its optical output performance helps it better integrate with robots as a flexible manufacturing equipment to meet 3D processing requirement.



Model	RFL-C10000X	RFL-C12000X	RFL-C15000	RFL-C20000	RFL-C30000
<b>Optical Properties</b>					
Average Output Power(W)	10000	12000	15000	20000	30000
Wavelength (nm)	1080±5				
Operation Mode	CW/Modulate				
Max. Modulation Frequency(kHz)	2		5		
Output Power Stability	±1.5				
Red Laser	Yes (Output Power 0.5mW~1mW)				
<b>Output Characteristics</b>					
Beam Delivery Optics	QD		QP		
Output Fiber Diameter(μm)	100 (Customizable)				150
BPP (mm.mrad)	≤4				7
Polarization State	Random				
Delivery Cable Length (m)	≤30		≤20		
<b>Electrical Characteristics</b>					
Power Supply (VAC)	323~437, Three Phase-four Wire Connect, @47-63Hz				
Control Mode	RS232/AD				
Power range (%)	10~100				
<b>Other Characteristics</b>					
Dimensions (mm)	1200×960×1160	15000XZ: 960×1220×1600	20000XZ: 1200×1220×1600	1320×1160 ×1600	
Cooling	Water cooling				
Operating Temperature	10~40 (°C)				

## Application

- Welding
- Cladding
- 3D Printing
- Cutting
- Sintering
- Surface Treatment

## Characteristic

- High Electro-optical Conversion Efficiency
- Customized Output Fiber Length
- Output Cable: QBH/QD
- Maintenance-free Operation
- Wide Modulation Frequency Range
- Small Size, Easy to Install



Brass cutting



30mm carbon steel bright surface cutting



Aluminum cutting



100mm stainless steel cutting

# 75W-300W QCW Fiber Lasers

## Introduction

The QCW fiber laser series developed by Raycus ranges from 75W to 1500W, with higher electro-optical conversion efficiency, better optical quality and lower maintenance cost. This series product is a perfect alternative of existing light-pumped YAG laser and is an ideal choice for spot welding, seam welding, boring and other industrial applications, which requires wide pulse and high peak out power due to its diversified compatibility and the convenience for most YAG systems to use with simple transformation.

## Application

- PCB Welding
- Soldering
- Ceramics Cutting
- Spot/Seam Welding
- Power Battery Welding
- Precision Welding /Cutting
- Electronic Parts Processing
- Alternative of Light-Pumped YAG Lasers

## Characteristic

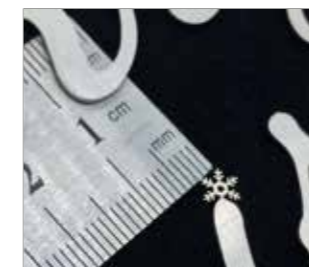
- Two Work Modes: Continuous and Pulse
- Peak Output 3000W
- QBH Output Connector and Optional Output Length
- Extremely Stable Output Performance
- Excellent Light Beam Quality
- Air-Cooled Heat Dissipation



Model	RFL-QCW 75/750	RFL-QCW 100/1000	RFL-QCW 150/1500	RFL-QCW 300/3000
<b>Optical Properties</b>				
Operation Mode	CW/Modulate			
Average Power (CW) (W)	120	100	250	300
Average power (Pulse) (W)	75	100	150	300
Max. Output Power (W)	750	1000	1500	3000
Max. Pulse Energy (J)	7.5	10	15	30
Wavelength (nm)	1080±5			
Repetition Frequency(Hz)	0-5000			
Pulse Width(ms)	0.05-50			
Output Power Stability (%)	<±1.5			
Red Laser	Yes			
<b>Output Characteristics</b>				
Beam Delivery Optics	IQB			
Output Fiber Diameter(μm)	50 (12,25 Optional)		50 (25,100,200)	
BPP (mm.mrad)	<1.2		<2.5	
<b>Electrical Characteristics</b>				
Power Supply (VDC)	48±10%VDC			
Control Mode	RS232/Ethernet	RS232/ AD/Ethernet		
Power Range (%)	10~100			
<b>Other Characteristics</b>				
Dimensions (mm)	280×440×148	390×189×460	570×234×565 (Handle Included)	
Cooling	Air-cooled			
Operating Temperature	10-40	0-40		



Precision welding



Precision cutting



Precision cutting



Precision welding

# 1000W-1500W QCW Fiber Lasers

## Introduction

The QCW fiber laser series developed by Raycus ranges from 75W to 1500W, with higher electro-optical conversion efficiency, better optical quality and lower maintenance cost. This series product is a perfect alternative of existing light-pumped YAG laser and is an ideal choice for spot welding, seam welding, boring and other industrial applications, which requires wide pulse and high peak out power due to its diversified compatibility and the convenience for most YAG systems to use with simple transformation.

## Application

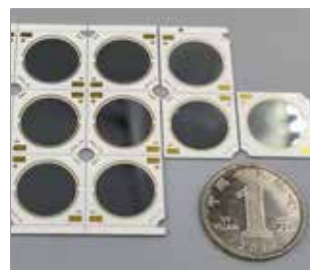
- PCB Welding
- Soldering
- Ceramics Cutting
- Spot/Seam Welding
- Power Battery Welding
- Precision Welding /Cutting
- Electronic Parts Processing
- Alternative of Light-Pumped YAG Lasers

## Characteristic

- Two Work Modes: Continuous and Pulse
- Peak Output 3000W
- QBH Output Connector and Optional Output Length
- Extremely Stable Output Performance
- Excellent Light Beam Quality
- Air-Cooled Heat Dissipation



Model	RFL-QCW 1000/3000	RFL-QCW 600/6000	RFL-QCW 2000/6000	RFL-QCW 1500/15000
<b>Optical Properties</b>				
Operation Mode	CW/Modulate			
Average Power (CW) (W)	1000	600	2000	1500
Average power (Pulse) (W)	1000	600	2000	1500
Max. Output Power (W)	3000	6000	6000	15000
Max. Pulse Energy (J)	100	60	200	150
Wavelength (nm)	1080±5			
Repetition Frequency(Hz)	0-5000			
Pulse Width(ms)	0.05-50			
Output Power Stability (%)	<±1.5			
Red Laser	Yes			
<b>Output Characteristics</b>				
Beam Delivery Optics	QBH	HQBH		QD
Output Fiber Diameter(μm)	50 (25,100,200)	100 (200,400 Optional)		
BPP (mm.mrad)	<2.5	<4		
<b>Electrical Characteristics</b>				
Power Supply (V DC)	380±10% VAC, 50/60Hz			
Control Mode	RS232/ AD/Ethernet			
Power Range (%)	10~100			
<b>Other Characteristics</b>				
Dimensions (mm)	913×480×235 (Handle Included)	900×960×1160	960×1220×1600	
Cooling	Water cooling			
Operating Temperature	10-40			



Ceramic cutting



Precision welding



Precision welding



Precision cutting

# Hundred Watt Fiber Delivered Direct Diode Lasers

## Introduction

The main applications of Hundred-watt fiber delivered direct diode lasers include laser soldering and plastic laser welding.

Laser soldering provides flexible solution for unleaded electronic soldering through accurate position, temperature control. Laser soldering possesses the characteristics of Non-contact soldering, heating speed, small heat affected zone, it would be more suitable for unleaded processing by fast heating and small heat influence.

At the laser beam-transmission welding plastic, this technique requires one part to be transmissive to a laser beam and the other part to be absorptive to the beam or a coating at the interface to be absorptive to the beam. The part where the two materials need to be joined will be formed together under certain pressure after the laser beam process the connecting parts.

## Application Market

- laser Soldering
- laser beam-transmission welding plastic

## Application Industry

- 3C electricity/ Optical communication/
- Micro-electricity/ Camera Mold etc
- Home appliances/car/lighting/medical/packaging, etc



Model	RFL-A50D	RFL-A100D	RFL-A200D
Output Power (W)	50	100	200
Output Power un-Stability	<±1%		
Wavelength (nm)	915±10nm, Customizable		
Pilot Laser Parameter	650±10nm, 0.25~1mW		
Fiber Core (um)	200		
Fiber(NA)	0.22		
Output Interface Type	SMA905/D80		
Control Method	RS232/AD		
Cooling	Air-Cooled		
Operation Power Source (V DC)	24	48	
Operating Temperature	0-40°C	0-30°C	



Plastic welding



Plastic welding



Plastic welding

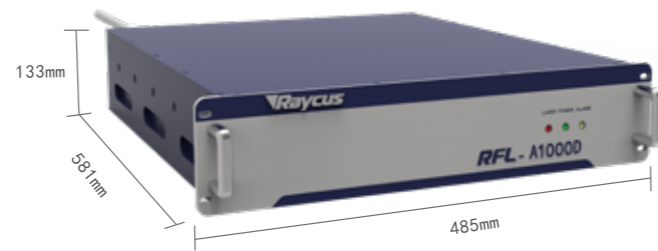


Laser soldering

# Medium Powered Fiber Delivered Direct Diode Lasers

## Introduction

Medium powered fiber delivered direct diode laser is mainly used for heat conduction welding with low material thickness. By the means of heat conduction welding, the laser beam melts joints of two sheets which need to be welded, and then forming the welding seam. Compared to traditional weld, heat conduction welding can not only reduce the material deformation, but also processes the weld faster. Conduction welding is similar to spot welding but allows the laser beam to move after the melt pool forms. Laser heat conduction welding can be realized more quickly and lower material distortion than usual welding methods. Additionally, smooth and pore-free welding seams are created that do not need any post-processing.



Model	RFL-A500D	RFL-A1000D	RFL-A1500D	RFL-A2000D
<b>Optical Properties</b>				
Average Output Power(W)	500	1000	1500	2000
Operation Mode	CW/Modulate			
Power Adjusting Range(%)	10~100			
Central Wavelength(nm)	915±10 Customizable			
Output Power unStability(%)	<3%			
Modulation Frequency(Hz)	50~5000			
Red Light Indicated Power (mW)	0.25~1			
<b>Output Characteristics</b>				
Terminal Type	IHQB			
Fiber core (μm)	300	400	400/600	
Beam Divergence (rad)	0.22			
Delivery Cable Length(m)	5 (Customizable)		10 (Customizable)	
<b>Electrical Characteristics</b>				
Operation Voltage(VAC)	Single Phase 220VAC ±10%、50/60Hz AC		Three Phase 380VAC ±10%、50/60Hz AC	
Control Method	AD			
<b>Other Characteristics</b>				
Dimensions (mm)	485×133×581(Handle Included)		485×133×661(Handle Included)	
Cooling	Water cooling			

## Application Industry

- Construction Hardware
- Hardware Tool
- Daily Hardware Welding
- Welding with low material thickness

# High Powered Fiber Delivered Direct Diode Lasers

## Introduction

High powered fiber delivered direct diode laser is mainly used in hardening and cladding.

Laser is the excellent heat source for metal parts hardening, it can improve abrasive resistance of parts without destroying the metallurgical properties of material. And laser will not cause the ferrite transform in unintended area so that the partial hardening can be realized easily while the induction hardening can not do the same thing. Because of laser hardening will not cause the material warping, there is no need to connect deformation of the workpiece with additional methods.

Laser cladding is a kind of additive manufacturing which can fuse material on substrate. The laser cladding is often used for manufacturing better brand new surface and repairing worn-out surface in the heavy industrial.

## Application Industry

- Mining machinery, Gas turbine power plant
- Steel rolling equipment, Large mould
- hardening, Cladding



Model	RFL-A3000D	RFL-A4000D	RFL-A6000D	RFL-A8000D
<b>Optical Properties</b>				
Output Power (W)	3000	4000	6000	8000
Operation Mode	CW/Modulate			
Power Adjusting Range(%)	10~100			
Central Wavelength(nm)	915±10			
Output Power un-Stability(%)	<3%			
Modulation Frequency(Hz)	50~5000			
Red Light Indicated Power (mW)	0.25~1			
<b>Output Characteristics</b>				
Terminal Type	IHQB			IQD
Fiber core (μm)	600	800		1000
Beam Divergence (rad)	0.22			
Delivery Cable Length(m)	20			
<b>Electrical Characteristics</b>				
Operation Voltage(VAC)	Three Phase 380VAC±10%、50/60Hz AC			
Control Method	RS-232/AD			
<b>Other Characteristics</b>				
Dimensions (mm)	650×900×980 (Trundle Included)	900×945×800 (Trundle Included)		1200×794×879 (Trundle Included)
Cooling	Water cooling			



Stainless steel welding



Stainless steel welding



Stainless steel welding



Stainless steel welding



Cladding



Quenching



Cladding



Quenching

# Adjustable Beam Profile Fiber Laser

## Introduction

Raycus ABP(adjustable beam profile) Fiber Laser is the welding choice for our customers. With our latest beam adjustable technology, the application of welding becomes different. Raycus RFL-ABP used our own developed fiber combiner to independently coupling different optical modules into the core and ring core of the multi-core fiber, the refined output of different modes such as Gaussian spot, ring spot, and mixed spot can be realized. The core ring or ring core power can be independently adjusted to achieve any power ratio, continuous and modulation modes can be adjusted independently, and different modes can be switched in milliseconds. Meeting the needs of high-quality laser cutting and welding has become another weapon to improve processing quality and efficiency.



## Technical Support

1. Full fiber structure, stable and reliable
2. The optical module is independently coupled into the core and ring core of the output fiber
3. Adjusted indecently the core or ring core power, millisecond switching between different modes
4. With waveform editing function

## Processing Advantage

1. Adjusted independently power of center spot and ring spot
2. Spatter-free welding
3. Stable weld formation and good consistency
4. Larger and stable molten, smaller temperature gradient

## Application

Lithium battery industry  
Electronic Component  
Car manufacturer



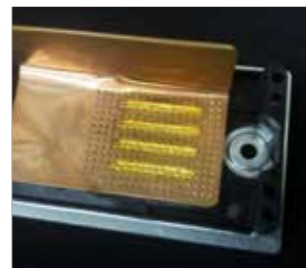
Explosion-proof valve welding



Busbar welding



Pole welding



Soft connection welding

Optical Properties							Test Conditions
Model	RFL-6000/6000	RFL-4000/4000	RFL-4000/2000	RFL-2000/4000	RFL-3000/3000	RFL-2000/2000	
Output power (kW)	12	8	6	6	6	4	Customizable
Core output power(kW)	6	4	4	2	3	2	Customizable
Ring core output power(kW)	6	4	2	4	3	2	Customizable
Operating mode	CW/Modulate						
Polarization direction	Random						
Power adjustment range (%)	10~100						
wavelength (nm)	1080±5						Rated output power
Output power stability (%)	±1.5						Rated output power; continuous running time: more than 5hrs; working temperature: 25°C
Modulation frequency (kHz)	5						Rated output power
Indicating red light output power (mW)	0.5~1						
Beam delivery optics	QD	QBH					
Core beam quality *(86%) (BPP,mm·mrad)	<2.2 (@50um) / <4 (@100um)						Rated output power
core divergence angle *(86%) (mrad)	<90(@50um) / <90 (@100um)						Rated output power
Ring core beam quality *(86%) (BPP,mm·mrad)	<7.0(@150um) / <17 (@300um)						Rated output power
Ring core divergence angle *(86%) (mrad)	<100(@150um) / <110 (@300um)						Rated output power
Core transmission fiber core diameter (um)	50、100、 Customizable						Customizable
Ring core transmission fiber core diameter (um)	150、300、 Customizable						Customizable
Output cable length (m)	20						Customizable
Electrical Characteristics							
Operating Voltage	Three-phase four-wire system AC340V~AC420V、50/60Hz (Included PE)						
Control method	Serial communication /AD						
Other features							
Dimensions (mm) width*height*depth	1200×960×1160	900×960×1160					Trundle included
Weight(kg)	<500	<400					With air conditioning
Operating temperature(°C)	10~40						
Operating humidity range	<70%						
Stored temperature (°C)	-10~60						
Cooling	Water cooling						



## High Power Fiber Laser with Shutter

Raycus high-power fiber laser with shutter can make one laser perform cutting, welding, drilling and cladding at the same time. The switching of equipment power and transmission fiber only takes a few milliseconds, which can significantly reduce the user's investment cost in equipment and improve processing efficiency.

Application field: automotive welding

### Advantages of shutter technology:

1. Single-way coupler, 2-way and 4-way time sharing fiber to fiber switch
2. Coupling efficiency  $\geq 96\%$
3. Short switching time,  $< 45\text{ms}$
4. Fast fiber fuse protection
5. Equipped with safe mechanical, electrical, control and monitoring systems
6. The beam switching device is reliable and can achieve hundreds of thousands of continuous switching

### Security:

- Comply with ISO 13849-1 international safety standard
- Safety Relays
- Double loop
- Surge protection
- AC voltage detection
- Water flow detection
- Leak detection

### Technical Parameters

Shutter type	Single-way	2-way	4-way
Max. power		12kW	
Input core diameter		100 $\mu\text{m}$	
Output core diameter		200-1000 $\mu\text{m}$	
Max.NA		0.14	
High transparent coating		1030-1090nm	
Optical fiber interface type		QBH/QD	
Cooling method		Water cooling	

### Raycus independently developed high-power shutters



## Fiber Delivered Direct Diode Blue Laser

### Application

Raycus newly launched Fiber Delivered Direct Diode Blue Laser is mainly aimed at the welding applications of common high-reflective materials, especially gold, silver, copper and other non-ferrous metals. It has been discovered that infrared wavelength lasers are not easy to weld copper materials due to the process window, and a lot of spatter will be generated during laser welding.

In the battery industry, parts have to be cleaned after welding is completed. At the same time, the absorption rate of welding with blue laser is higher, which is about 10 times that of infrared band. Therefore, blue light only needs lower power in the same application to ensure the same efficiency and cleanliness.

Mainly used in the welding of gold, silver, copper and other non-ferrous metals, and can be used in the welding of new energy batteries, 3C and alloy welding and other fields.

### Characteristic

Optics: High beam quality, high absorptivity of non-ferrous metals, and high stability.

Electricity: Equipped with an easy-to-operate host computer, which can be connected to the laser through the RS232/network port, which is convenient for the user to interact with the laser. The external control AD mode directly operates the laser to emit light, which is easy to integrate into the user's industrial control system. Comes with a variety of detection functions to ensure the stable operation of the laser.

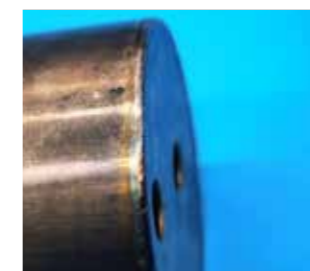
Structure: The main structure of the chassis is made of high-strength carbon steel, which is stable and reliable, and the reasonable waterway layout is stable and heat dissipation. A total of 4 handles are equipped on the front and rear for convenient and safe transportation.



Model	RFL-B500D
Power(W)	500
wavelength (nm)	430-470
Beam quality (mm-mrad)	44
Fiber core diameter ( $\mu\text{m}$ )	400
Optical fiber numerical aperture	0.22 NA
Index laser	650nm, 0.25~1mW
Output power stability (%)	$\leq 3\%$
Output cable type	QBH armored casing jumper (with protective lens)
Output cable length (m)	10 (Customizable)
Control method	External analog control RS232 control
Modulation Frequency(Hz)	5
Cooling	Water cooling
Operating temperature( $^{\circ}\text{C}$ )	0~40
Operating humidity range (%)	$< 70$
Dimensions (mm) width*height*depth	485 × 799 × 237 (Handle Included)



Brass welding



Brass welding



Brass welding



Brass welding

Application

