



Stock Code:300747

**Raycus**

[en.raycuslaser.com](http://en.raycuslaser.com)

**PRODUCT MANUAL**

## Wuhan Raycus Fiber Laser Technologies Co.,Ltd.

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**Reshape Fiber Lasers**

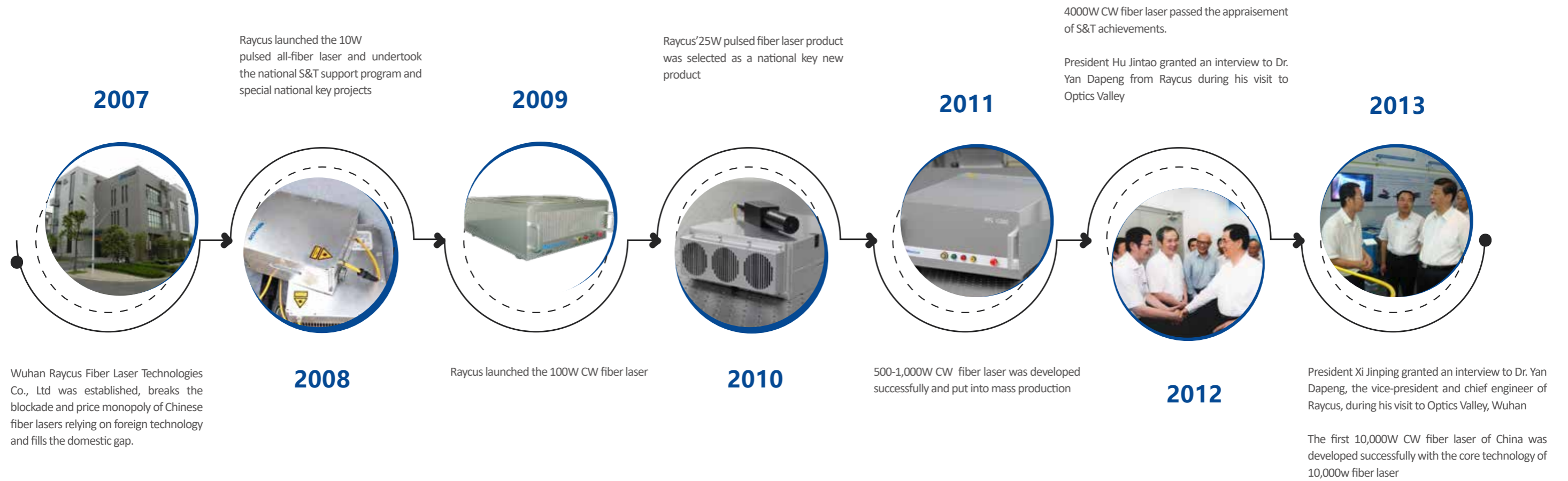


## ABOUT US

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

2007-2020



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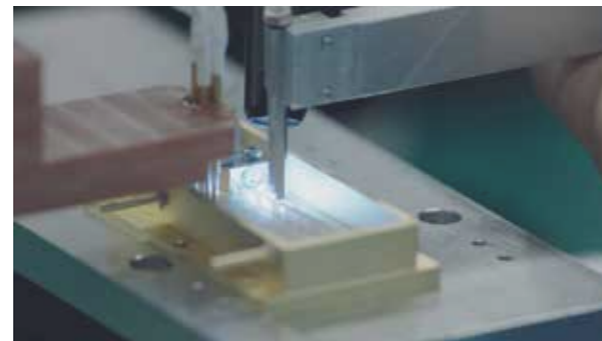


# CORE COMPETITIVENESS

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## Brand Advantage

Raycus is a leading fiber laser company in laser industry, also is the first listed company among the domestic laser company. And with the 13-year unremitting efforts and steady development, Raycus has acquired a high market share and good reputation.

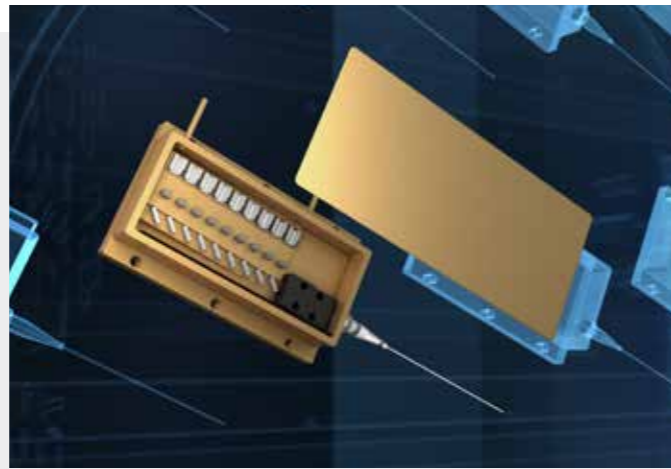
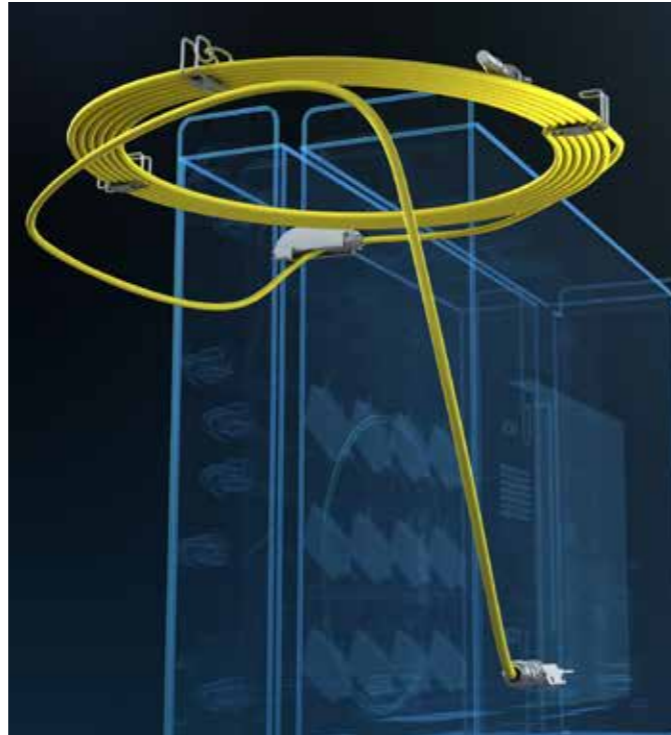
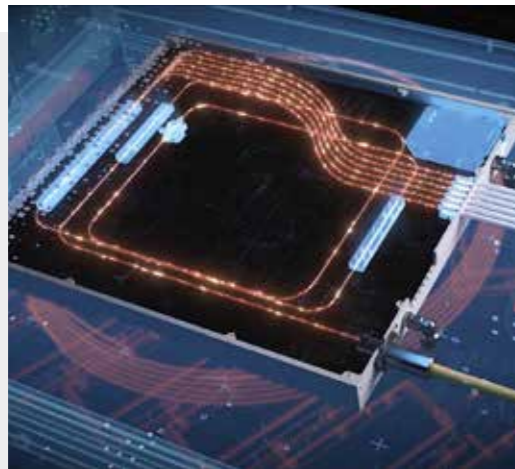
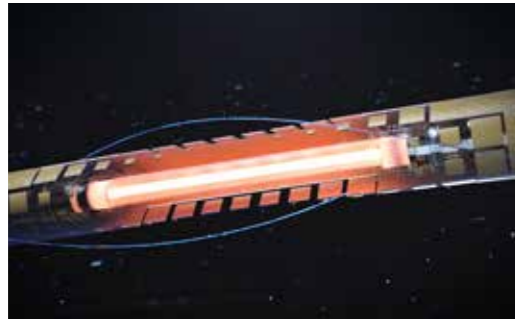
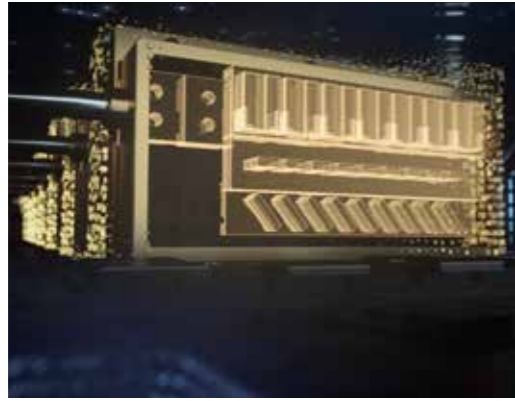




## Talent and Technology Advantages

Raycus focuses on innovation and employees, these two factors can provide a strong support for our implementation of sustainable development. Our company regards talented employee as the first development strategy, and continuously form the R&D team which is composed of high-level technical talents around the world.

Raycus has the advanced technology in the fiber laser field. The company possesses more than 200 patents cover invention, design, model, so realized the laser independent research and development and production.



## Industrial chain integration and intelligent manufacturing

Through independent R&D and industrial mergers and acquisitions, our company has mastered core technologies like pumping source, special fiber, fiber coupler, transmission cable and power combiner, as well as the relevant key technologies of material mass productivity; with the vertical integration of the upstream industry chain of fiber laser, the company has improved its capacity of R&D and quality control of fiber laser greatly, and has become more competitive in the market.

In addition, as industry competition intensifies, company consolidates the advantages of scale production and improve productivity about 50% by means of automatic upgrade and renovation and cost decreasing while improving product quality.

## Marketing and After-sales Service Advantages

In order to provide customers a considerate service, the company plans to establish two main offices cover the Europe, East Asia, Africa and Asia-Pacific respectively based on previous service network station. The service station can provide repair, component and backup machine, also can respond rapidly to requests from customers.

# Raycus' laser, your core power

- Multi-module CW Fiber Lasers
- Single Module CW Fiber Lasers
- QCW Fiber Lasers
- High Power Narrow Linewidth Fiber Lasers
- Q-switched Pulsed Fiber Lasers
- MOPA Fiber Lasers
- Fiber Delivered Direct Diode Lasers
- High Power Pulsed Fiber Lasers

## Good-looking

- Smaller size
- Lighter weight
- easy to use
- Sophisticated workmanship

## High reliability

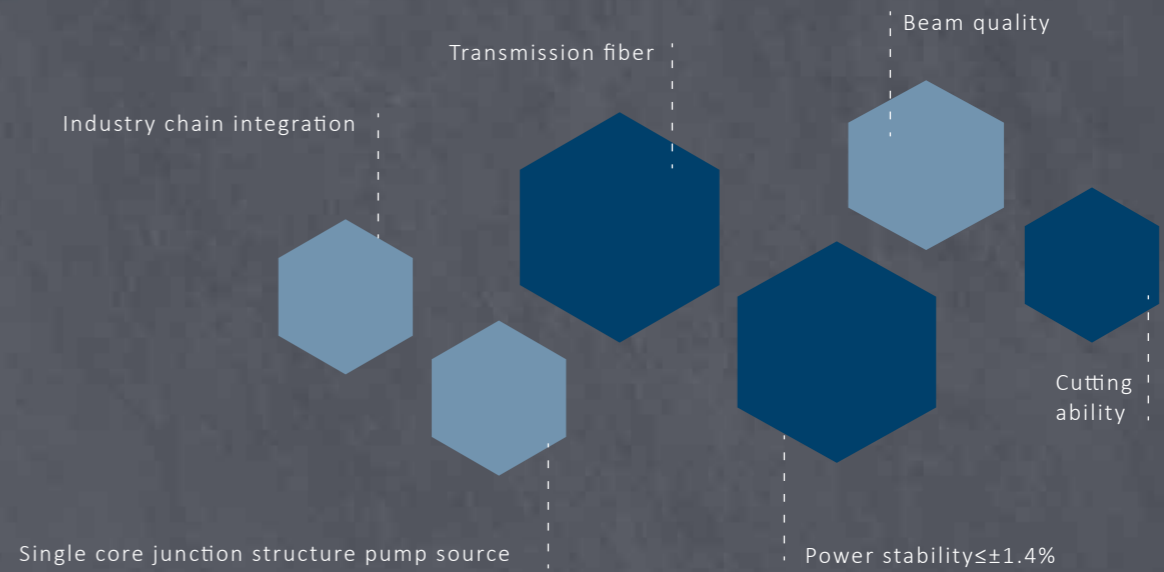
- Active dehumidification,
- 3-level temperature monitoring
- Double emergency safety protection
- Waterproof, dustproof and rustproof
- Easy to customize

## High performance

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

## High intelligence

- Remote operation and maintenance platform
- Intelligent management software
- Intelligent after-sales service function



Standard protection window

### QBH quartz crystal protection window

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 window

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



# Specifications

Model	RFL-P20QE	RFL-P20QS	RFL-P30QS	RFL-P30Q	RFL-P50QB	RFL-P100Q
<b>Optical Properties</b>						
Average Output Power(W)	20	20	30	30	50	100
Central Wavelength(nm)	1064					
Repetition Frequency Range (kHz)	30-60	30-60	40-60	30-60	50-100	20-200
Output Power Stability	<3%					<5%
<b>Output Characteristics</b>						
Output Beam Diameter(mm)	7±1					6.5±1
M <sup>2</sup>	<1.5		<1.6			
Polarization State	Random					
Pulse Width(ns)	110-140	110-140	130-150	110-130	120-150	50-110
Max.Single Pulse Energy(mJ)	0.67		0.75	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	260×120×340	215×95×290		260×120×340		360×123×390
Cooling	Air-cooled					
Operating Temperature(°C)	0-40					

## Introduction

The 20-100W Q-Switched Pulse Fiber Laser Series developed by Raycus is the industrial marking and micromachining laser. This series pulse 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

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

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

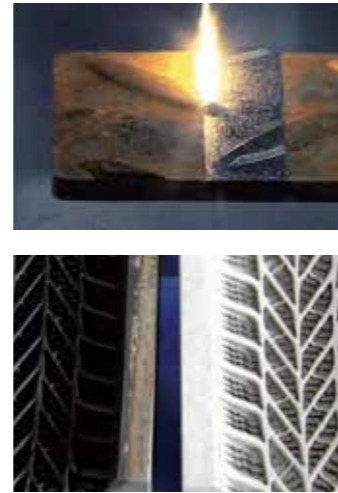
## Specifications

Model	RFL-P20MX	RFL-P30MX	RFL-P70M	RFL-P100M	RFL-P200S
<b>Optical Properties</b>					
Nominal Output Power(W)	20	30	70	100	200
Central Wavelength(nm)	1064				
Repetition Frequency Range (kHz)	1-2000		20-1000		20-2000
Output Power Stability	<3%		<5%		
<b>Output Characteristics</b>					
Output Beam Diameter (mm)	7 $\pm$ 1		6.5 $\pm$ 1		5.5-8
M <sup>2</sup>	<1.3	<1.5	<1.6		<1.8
Polarization State	Random				
Pulse Width (ns)	2-500 (Customizable)		10-350 (Customizable)		10-240 (Customizable)
Max. Single Pulse Ener(mJ)	0.7	1.0			
Delivery Cable Length(m)	3 (Customizable)				
<b>Electrical Characteristics</b>					
Power Supply (V DC)	24				
Power Range (%)	0~100				
<b>Other Characteristics</b>					
Dimensions (mm) width*height*depth	215 $\times$ 95 $\times$ 286		360 $\times$ 123 $\times$ 390	360 $\times$ 123 $\times$ 390	400 $\times$ 121 $\times$ 460
Cooling	Air-cooled				
Operating Temperature( $^{\circ}$ C)	0-40				

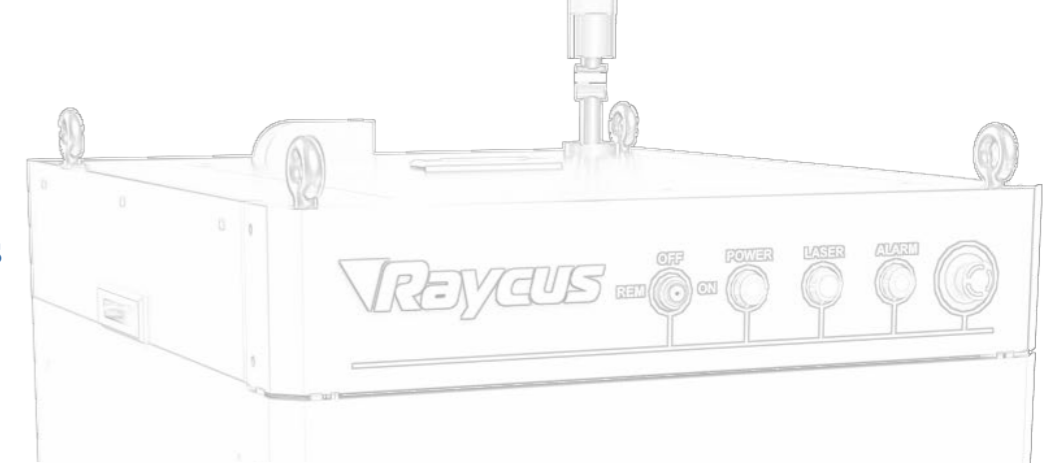
## Characteristic

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

# High-power Pulsed Fiber Lasers



## 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	120-140	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		10	15	20
<b>Electrical Characteristics</b>					
Power Supply (V AC)	220,50/60Hz				Three phase 380 50/60Hz
Power Range(%)	10~100				10~100
<b>Other Characteristics</b>					
Dimensions (mm) width*height *depth	485×237×764		502×254×755	698×898×865	1018×836×850
Cooling	Water Cooling				
Operating Temperature(°C)	10-40				

## 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

Oil Cleaning

Mold Surface Treatment

Paint Stripping

Welding Surface Pre-treatment

Portrait Stone Surface Treatment

## Characteristic

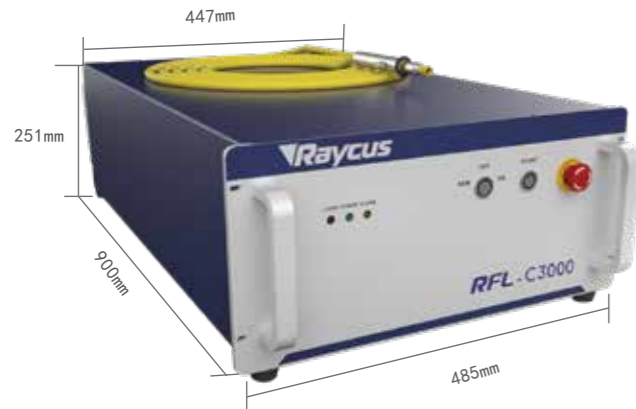
Uniform Control Interface

Adjustable Frequency Range

High Single Pulse Energy

Excellent Light Beam Quality

# 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 has higher electro-optical conversion efficiency, higher and more stable optical quality, stronger altitude stress-resisting capacity and it applies optimized second-generation fiber transmission system to ensure more stable and more sophisticated cutting effect in thick sheet cutting. This machine applies to many application scenarios: cutting, welding, holing, medical device processing, etc., with a narrow seam of the cut sheet and bright section. Compared with same lasers, it has obvious advantages.

## Application

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

## 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 QualityM <sup>2</sup>	1.1 (25μm)		1.3 (25μm)		5-7 (50um)		
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	485×237×748(handle included)				900×447×251 (handle included)		
Weight(kg)	<50			<70		<80	
Cooling	Water Cooling						
Operating Temperature(°C)	10-40						

# Multi-module CW Fiber Lasers



## Introduction

The Multi-module CW Fiber Lasers developed by Raycus ranges from 3,000W 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, 3Dprinting and other fields. Its optical output performance helps it better integrate with robots as a flexible manufacturing equipment to meet 3D processing requirement.

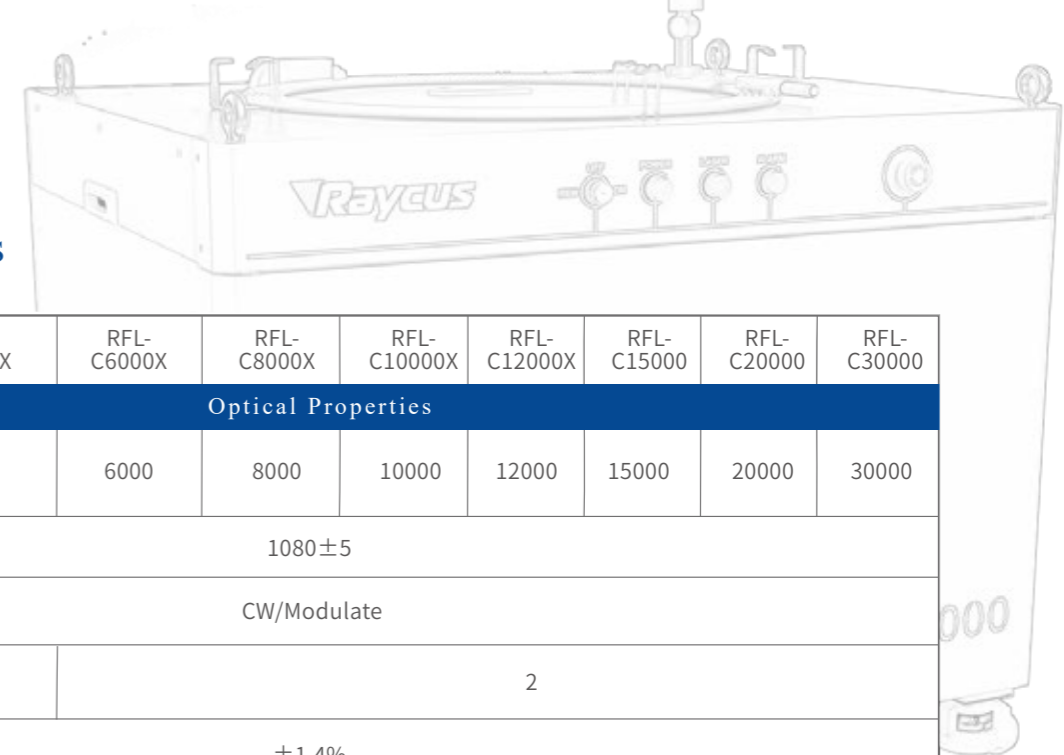
## Application

- Cutting
- Welding
- Cladding
- 3D Printing
- 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

## Specifications



Model	RFL-C4000X	RFL-C6000X	RFL-C8000X	RFL-C10000X	RFL-C12000X	RFL-C15000	RFL-C20000	RFL-C30000	
<b>Optical Properties</b>									
Output Power(W)	4000	6000	8000	10000	12000	15000	20000	30000	
Wavelength(nm)	1080±5								
Operation Mode	CW/Modulate								
Max. Modulation Frequency(kHz)	5		2						
Output Power Stability	±1.4%								
Red Laser	Yes (Output Power0.5mW~1mW)								
<b>Output Characteristics</b>									
Beam Delivery Optics	QBH (Customizable)		QD						
Output Fiber Diameter(μm)	100 (Customizable )							200	
BPP(mm.mrad)	≤4.5		≤5			≤8		≤10	
Polarization State	Random								
Delivery Cable Length (m)	≤20		≤30			≤20			
<b>Electrical Characteristics</b>									
Power Supply (VAC)	323~437, Three Phase-four Wire Connect, @47-63Hz								
Control Mode	RS232/AD/ RS232/ AD								
Power range (%)	10~100								
<b>Other Characteristics</b>									
Dimensions (mm) width*height *depth	670×990×1160		900×960×1160		1200×960×1160		960×1600×1188	1200×1220×1600	1320×1220×1600
Weight(kg)	<280	<360	<400	<450	<500	<800	<950	<1200	
Cooling	Water cooling								
Operating Temperature (°C)	10-40								

# QCW Fiber Lasers



## Introduction

The QCW fiber laser series developed by Raycus ranges from 75W to 300W, 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.

## 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

## Application

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

## Specifications

Model	RFL-QCW75/750	RFL-QCW150/1500	RFL-QCW300/3000
<b>Optical Properties</b>			
Operation Mode	CW/Modulate		
Average Power (CW) (W)	120	250	300
Average power (Pulse) (W)	75	150	300
Max. Output Power (W)	750	1500	3000
Max. Pulse Energy (J)	7.5	15	30
Wavelength (nm)	1080±5		
Repetition Frequency(Hz)	0-5000	0-5000	0-5000
Pulse Width(ms)	0.05-50	0.05-50	0.05-50
Output Power Stability	<±1.5%		
Red Laser	Yes		
<b>Output Characteristics</b>			
Beam Delivery Optics	QBH		
Output Fiber Diameter(μm)	12, 25, 50	50, 100, 200	
BPP(mm.mrad)	0.4, 0.5, 1.5	1.5, 2.5, 5	
<b>Electrical Characteristics</b>			
Power Supply (V DC)	48		
Control Mode	RS232/ AD/Ethernet		
Power Range (%)	10~100		
<b>Other Characteristics</b>			
Dimensions (mm) width*height *depth	280×148×440	420×190×485	570×234×565 (handle included)
Weight(kg)	<30	<40	<60
Cooling	风冷		
Operating Temperature(°C)	10-40	0-40	

# Fiber Delivered Direct Diode Lasers

## Introduction

### Hundred Watt Fiber Delivered Direct Diode Lasers

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 joint will be formed together under certain pressure after the laser beam process the connecting parts.



### Medium Powered Fiber Delivered Direct Diode Lasers

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 weld, and then forming the welding seam. Compared to traditional weld, heat conduction welding can not only reduce the material deformation, but also can process 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.

### High Powered Fiber Delivered Direct Diode Lasers

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.

# Hundred Watt Fiber Delivered Direct Diode Lasers

## 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



## Specifications

型号	RFL-A80D	RFL-A100D	RFL-A200D
Output Power (W)	80	100	200
Output Power un-Stability	<±1%		
Wavelength (nm)	915±10nm, Another Wavelength Customizable		
Pilot Laser Parameter	650±10nm, 0.25~1mW		
Fiber Core (um)	200		
光纤NA	0.22		
Output Interface Type	SMA905/D80		
Control Method	Touch Panel/RS232/AD		
Cooling	Air-Cooled		
Operation Power Source (VDC)	24		48
Operating Temperature	0-40°C		

## Medium Powered Fiber Delivered Direct Diode Lasers

### Application Market

Welding with low material thickness



### Application Industry

Construction Hardware, Hardware Tool, Daily Hardware Welding

### Specifications

Model	RFL-A500D	RFL-A1000D	RFL-A1500D	RFL-A2000D
<b>Optical Specifications</b>				
Output Power (W)	500	1000	1500	2000
Operation Mode	CW/Modulate			
Power Adjusting Range(%)	10~100			
Central Wavelength(nm)	915±10 Another Wavelength Customizable			
Output Power unStability	<3%			
Modulation Frequency(Hz)	50~5k			
Red Light Indicated Power (mW)	0.25~1			
<b>Output Cable Specifications</b>				
Terminal Type	QBH			
Fiber core (μm)	300/400		400/600	
Beam Divergence (rad)	0.22			
Delivery Cable Length(m)	5		10	20
<b>Electrical Specifications</b>				
Operation Voltage(V AC)	Single Phase 220VAC±10%、50/60Hz AC		Three Phase 380VAC±10%、50/60Hz AC	
Control Method	AD			
<b>Other Specifications</b>				
Dimensions (mm) width*height*depth	440×104×508(Handle Included)		485×237×765(Handle Included)	
Cooling	Water Cooling			

## High Powered Fiber Delivered Direct Diode Lasers

### Application Market

hardening, Cladding

### Application Industry

Mining machinery, Gas turbine power plant, Steel rolling equipment,

Large mould



### Specifications

Model	RFL-A3000D	RFL-A4000D	RFL-A6000D	RFL-A8000D
<b>Optical Specifications</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)	50~5k			
Red Light Indicated Power (mW)	0.25~1			
<b>Output cable Specifications</b>				
Terminal Type	HQBH			QD
Fiber core (μm)	600	800		1000
Beam Divergence (rad)	0.22			
Delivery Cable Length(m)	20			
<b>Electrical Specifications</b>				
Operation Voltage(V AC)	Three Phase 380VAC±10%、50/60Hz AC			
Control Method	RS-232/AD			
<b>Other Specifications</b>				
Dimensions (mm) width*height*depth	650×900×980 (Trundle Included)	900×945×800 (Trundle Included)		890×830×800 (Trundle Included)
Cooling	Water Cooling			