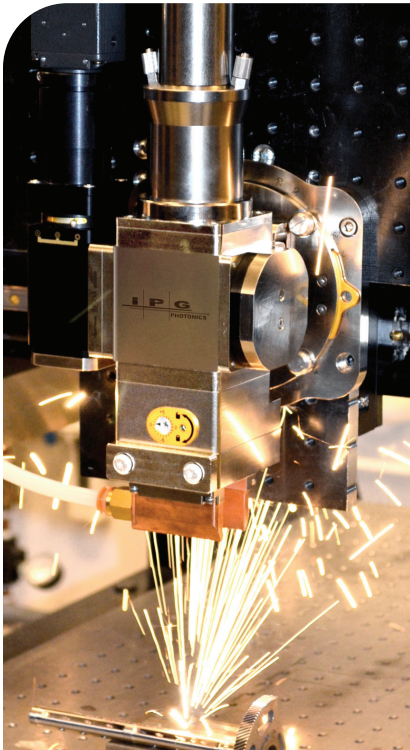




Industrial Fiber Lasers for Materials Processing from the World Leader in Fiber Lasers

PRODUCT GUIDE



Applications



Features



Efficiency



Capabilities

FIBER LASER ADVANTAGES

What you can expect from an IPG Fiber Laser



IPG Photonics Corporation is the world leader in high power fiber lasers and amplifiers. Founded in 1990, IPG pioneered the development and commercialization of optical fiber-based lasers for use in a wide range of venues such as materials processing, telecom, medical, scientific and other advanced applications. Fiber lasers have revolutionized the industry by delivering superior performance, reliability and usability at a lower total cost of ownership compared with conventional lasers, allowing end users to increase productivity and decrease operating costs.

IPG is the only company that controls the performance, cost and yield of both active fibers and semiconductor pump diodes- the core technology of the fiber laser. IPG develops and manufactures process fibers, beam couplers and switches, collimators, chillers and most recently processing heads and fully custom laser systems. This innovation, coupled with extensive manufacturing capabilities, place IPG in the rare position of being in full control of every step needed to achieve this mission: to deliver innovative, reliable, high quality and high performance fiber lasers at a cost-effective price.

The product of this mission is exemplified best through IPG's most popular laser family, the YLS Series. Ranging in power from 500 W to 100 kW, operating in CW or modulated modes up to 20 kHz with wall-plug efficiencies greater than 30%, the dynamic operating range of these devices is available from 10% to full power with no change in beam divergence or beam profile throughout the entire range. This allows a single laser to be utilized for both high and low power applications such as welding, drilling and precision cutting, a previously unheard of capability. IPG lasers' divergence specifications are far superior than other lasers and allow the use of long focal length processing lenses for vastly improved depth of field, less damage to optical components and are ideal for remote applications.

MAIN FEATURES

- Excellent Beam Parameter Product (BPP)
- Constant BPP Over Entire Power Range
- Small Focus over Large Working Distance
- Over 30% Wall-plug Efficiency
- Maintenance-free Operation
- Modular 'Plug & Play' Design
- Compact, Rugged & Easy to Install
- Integrated Coupler or Beam Switch

Fiber lasers deliver their energy through an integrated flexible optical fiber. Fiber lasers have a monolithic, entirely solid state, fiber-to-fiber design that does not require mirrors or optics to align or adjust. These features make fiber lasers easier to integrate and operate in production, medical and other laser-based systems. Fiber lasers are typically smaller and lighter in weight than traditional lasers, saving valuable floor space. While conventional lasers can be delicate due to the precise alignment of mirrors, fiber lasers are more rugged and able to perform in variable working environments. These qualities permit fiber laser systems to be transported easily.

IPG is headquartered in Oxford, Massachusetts with additional manufacturing plants, sales and service offices throughout the world.

FIBER LASER FAMILIES

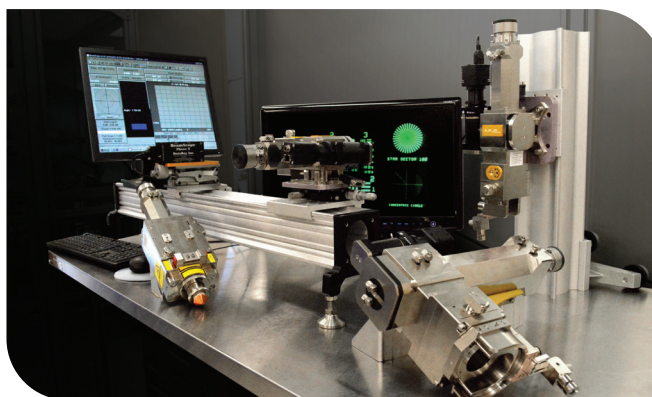
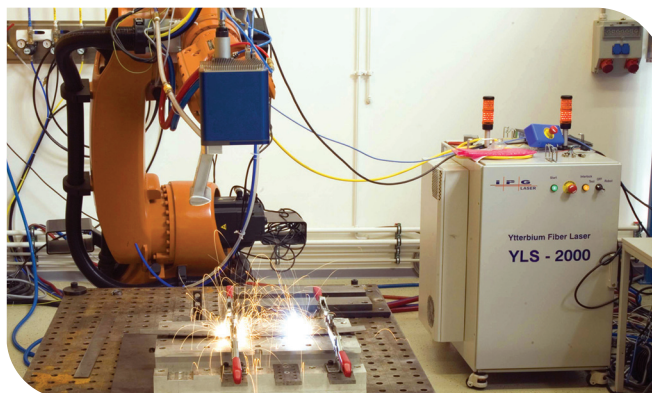
A Diverse Range for a Multitude of Applications

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APPLICATION GUIDE	YLS	YLR	QCW	GLR	GLP	TLR	YLP
Ablation					○		○
Annealing	○			○			
Brazing	○						
Cladding	○						
Cutting	○	○	○	○	○		○
Deep Engraving				○	○		○
Drilling	○		○		○		○
Heat Treating	○						
Marking				○	○	○	○
Soldering		○		○			
Welding	○	○	○	○		○	

YLS SERIES

High Power CW Ytterbium Fiber Laser Systems



Applications

- Annealing
- Brazing
- Cladding
- Cutting
- Drilling
- Heat Treating
- Welding



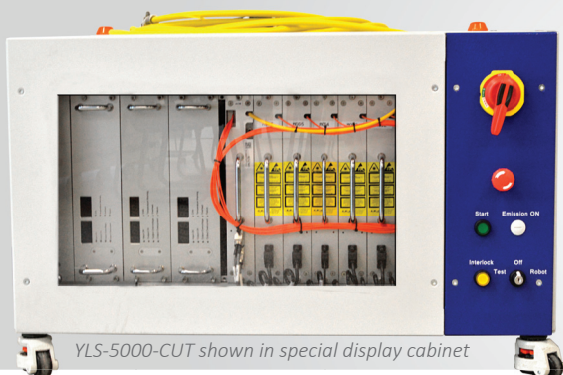
Efficiency

- > 30% Wall-plug Efficiency (WPE)
- 40% WPE on ECO Series
- Industry Leading Diode Lifetime



Capabilities

- Plug & Play Design
- Compact, Rugged & Efficient
- Output Power up to 100 kW



YLS-5000-CUT shown in special display cabinet



Standard Features

The YLS series fiber laser, with output powers up to 100 kW, was developed as a complete system for industrial applications. They have garnered wide acceptance in the very demanding automotive, aerospace and oil and gas industries. All YLS systems are housed in a NEMA 12, air-conditioned and sealed cabinets adding to the robustness of the unit. These systems are controlled by either digital I/O, analog control or IPG's own LaserNet software with the additional option to add either DeviceNet, Profibus or Ethernet interfaces. Developed as a complete system, this design features the widest range of fiber diameters, as well as the option to terminate to up to 6 ports from one power source.

YLS LASER CONFIGURATIONS

Single-output Identifiers

1 kW | 2 kW | 3 kW | 4 kW | 5 kW | 6 kW | 7 kW - 10 kW

YLS Basic

The YLS Basic fiber laser is available in up to 10 kW single-mode and 100 kW multi-mode output power. The Basic has a direct feeding fiber terminating in either an HLC-8 (QBH-type) or LCA (QD-style) connector in standard lengths of up to 30 meters.

○ YLS-1000	○ YLS-2000	● YLS-3000	● YLS-4000	● YLS-5000	● YLS-6000	● YLS-7000... YLS-10000
50 μm feed standard, also available in either 100 or 200 μm diameter.				100 μm standard, also available in 50 or 200 μm diameter.		100 μm feed standard 200 μm diameter available

YLS-CUT

IPG's family of kW class CUT lasers are specifically designed for high performance in harsh cutting environments. The CUT series features a super compact design with the laser housed in an hermetically sealed cabinet. A dehumidifier is installed within the cabinet to ensure optimal internal humidity. The lasers have a wall-plug efficiency of over 35%, so the electrical cost savings our lasers are famous for continues to improve. Hot redundancy ensures 100% up time with no change in power, ensuring record reliability and maintenance free operation. The CUT series are available from 1-6 kW with a wide variety of fiber delivery options, starting at 50 μm core diameter.

● YLS-1000-CUT ● YLS-2000-CUT ● YLS-3000-CUT ● YLS-4000-CUT ● YLS-5000-CUT

50 μm feed standard, also available in either 100 or 200 μm diameter.



YLS-ECO

IPG Photonics' YLS-ECO family is a new generation of kW class low-mode Ytterbium fiber lasers with record wall-plug efficiency of over 40%. IPG's Eco series offers a new, unparalleled level of reliability. The ECO series is perfectly suited for applications that cannot tolerate any downtime or service intervention.

○ YLS-1000-ECO ○ YLS-2000-ECO ● YLS-3000-ECO ● YLS-4000-ECO ● YLS-5000-ECO ● YLS-6000-ECO

50 μm feed standard, also available in either 100 or 200 μm diameter.

100 μm standard,
also available in 50 or 200 μm diameter.

CABINET SIZE
DENOTED BY
COLOR

- 12U NEMA 12 Enclosure
H x W x D, 558 x 790 x 815 mm
- 12U Extended NEMA 12 Enclosure
H x W x D, XXX x 790 x 815 mm

- 25U NEMA 12 enclosure
H x W x D, 1186 x 856 x 806 mm

- 31U NEMA 12 Enclosure
H x W x D, 1482 x 856 x 806 mm
- 31U NEMA 12 w/ Side Cabinet
H x W x D, 1490 x 1480 x 810 mm



Multiple Fiber Outputs: Options & Features

The YLS laser also features the option to terminate up to six ports from one power source. Delivery optics up to four ports can be housed inside the main laser cabinet, with six ports available in a separate NEMA 12 housing for safety and enhanced mobility. IPG develops and manufactures all delivery optics in-house which allows for fast lead times and enhanced in-house support. Available options include couplers, beam shutters, beam switches and shearers in D12.5, D25 and D50 diameters; see page 11 for available optics.

Multi-output Capabilities



- Up to 6 Ports for Simultaneous or Alternating Work Cells
- Process Fibers Available in up to 1 μ dia.
- 100 % Beam Switching or Variable Beam Shearing Available
- Beam Dump on Switches
- Multi-application use from one Laser



YLS LASER CONFIGURATIONS

Multi-output Identifiers

1 kW	2 kW	3 kW	4 kW	5 kW	6 kW	7 kW - 10 kW
50 μ m feed standard, also available in either 100 or 200 μ m diameter.			100 μ m standard, also available in 50 or 200 μ m diameter.			100 μ m feed standard 200 μ m diameter available
YLS with Internal Coupler:			Internal 1" coupler. Allows for a multitude of passive fiber lengths & widths. Provides extra protection if fiber damage occurs.			
● YLS-1000-CT	● YLS-2000-CT	● YLS-3000-CT	● YLS-4000-CT	● YLS-5000-CT	● YLS-6000-CT	● YLS-7000-C... ● YLS-10000-C
YLS with Internal Beam Shutter			Internal 1" shutter. Allows for a multitude of passive fiber lengths & widths. Provides extra protection as well as faster on/off.			
● YLS-1000-S1T	● YLS-2000-S1T	● YLS-3000-S1T	● YLS-4000-S1T	● YLS-5000-S1T	● YLS-6000-S1T	● YLS-7000-S1... ● YLS-10000-S1
YLS with Internal Beam Switch			Internal beam switching, D50. Allows for multi-station and application processing. Part numbers for 2, 3 and 4 way switches shown below.			
YLS-1000-S2T	YLS-2000-S2T	YLS-3000-S2T	YLS-4000-S2T	YLS-5000-S2T	YLS-6000-S2T	YLS-7000-S2...
YLS-1000-S3T	YLS-2000-S3T	YLS-3000-S3T	YLS-4000-S3T	YLS-5000-S3T	YLS-6000-S3T	YLS-8000-S3
● YLS-1000-S4T	● YLS-2000-S4T	● YLS-3000-S4T	● YLS-4000-S4T	● YLS-5000-S4T	● YLS-6000-S4T	● YLS-10000-S4
YLS with Internal Beam Shearer			2-way beam shearer, D50, 50:50 split. For simultaneous operation of 2 stations each at 50% power. (Four port option also available with switching in ports A/B & C/D shearing, "SS4T" suffix.			
● YLS-1000-SS2T	● YLS-2000-SS2T	● YLS-3000-SS2T	● YLS-4000-SS2T	● YLS-5000-SS2T	● YLS-6000-SS2T	● YLS-7000-SS2... ● YLS-10000-SS2

YLS-Tropical

YLS System with an affixed chiller. Only available for certain output powers and configurations.
Note: 31U with side cabinet required for 4 - 6 kW units.

YLS-1000-TR	YLS-2000-TR					
YLS-1000-CUT-TR	YLS-2000-CUT-TR					
YLS-1000-CT-TR	YLS-2000-CT-TR					
● YLS-1000-S2T-TR	● YLS-2000-S2T-TR					
YLS-1000-S3T-TR	YLS-2000-S3T-TR					
YLS-1000-S4T-TR	YLS-2000-S4T-TR					
YLS-1000-SS2T-TR	YLS-2000-SS2T-TR					
			● YLS-4000-S2-TR	● YLS-5000-C-TR	● YLS-6000-C-TR	
			YLS-4000-S3-TR	YLS-5000-S2-TR	YLS-6000-S2-TR	
			YLS-4000-S4-TR	YLS-5000-S3-TR	YLS-6000-S3-TR	
			YLS-4000-SS2-TR	YLS-5000-S4-TR	YLS-6000-S4-TR	
				YLS-5000-SS2-TR	YLS-6000-SS2-TR	

YLR SERIES

Rack Mounted CW Ytterbium Fiber Lasers

YLR LASER CONFIGURATIONS



Applications

- Cutting
- Soldering
- Drilling
- Welding



Efficiency

- Over 30% Wall-plug Efficiency
- Industry Leading Diode Lifetime



Capabilities

- Pulse Modulation
- Plug & Play Design
- Multi port options available
- Compact, Rugged & Efficient



Standard Features



IPG's YLR Series represents a new generation of diode-pumped CW fiber lasers of near infrared spectral range (1060-1080 nm) with a unique combination of high power, ideal beam quality, fiber delivery and high wall-plug efficiency. The YLR laser is offered as a cost-effective, adaptable solution for a clean room system or for integration into a production line. Featuring a front panel touch-screen display or rear control via Analog, RS-232, or Ethernet interfaces, the rack mount configuration is ideal for a multitude of applications from cutting, welding and drilling to medical device manufacturing.

Features Output powers up to 1 kW water-cooled (WC) with air-cooled (AC) models up to 500 Watts. IPG D12.5 external delivery optics are available for the YLR Series (see page 5).

YLR LASER PART NUMBERS

CABINET SIZE DENOTED BY GRADIENT

3U 19" rack W 448 x D 403 x H 132	4U 19" Rack W 449 x D 503 x H 177	6U 19" Rack W 448 x D 502 x H 266					
OUTPUT POWER (WATTS)							
100 W	200 W	300 W	400 W	500 W	600 W	700 W	1,000 W

Multi-mode YLR

100 to 1,000 W lasers equipped with a standard 50 μ m feeding fiber to HLC-8 connector. Additional options include 100 or 200 μ m diameters to HLC-8 connector or 50, 100 or 200 μ m to an affixed collimator. Available focal lengths: 20, 38 or 53 mm.

YLR-100-MM-AC	YLR-200-MM-AC	YLR-300-MM-AC	YLR-400-MM-AC	YLR-500-MM-AC			
YLR-100-MM-WC	YLR-200-MM-WC	YLR-300-MM-WC	YLR-400-MM-WC	YLR-500-MM-WC	YLR-600-MM-WC	YLR-700-MM-WC	YLR-1000-MM-WC
50 μ m feed fiber to HLC-8 Connector							

Single-mode YLR

100 to 1,000 W lasers equipped with a 5 mm beam diameter affixed collimator for powers up to 400 Watts; 500- 1,000 Watt lasers terminate to an HLC-8 connector. Interchangeable collimators and processing heads connect easily to the HLC-8, options listed on page 9. Affixed collimator options include beam diameters in either 2.5 or 7.5 mm.

YLR-100-AC	YLR-200-AC	YLR-300-AC	YLR-400-AC	YLR-500-AC			
YLR-100-WC	YLR-200-WC	YLR-300-WC	YLR-400-WC	YLR-500-WC	YLR-600-WC	YLR-700-WC	YLR-1000-WC
Single-mode feed fiber to Affixed Collimator (5 mm beam diameter)				Single-mode feed fiber to HLC-8 Connector			

ELR, TLM & TLR LASER CONFIGURATIONS

Erbium or Thulium lasers are also available in a rack design, available models listed below. Green (532 nm) offerings can be found on page 8.

The Erbium fiber laser (ELR Series), operating in the 1530-1620 nm "eye-safe" wavelength with output powers up to 200 Watts, is a unique instrument that provides a diffraction-limited, high-power CW light source. Typical industrial applications include plastic and polymer welding.

AVAILABLE MODELS: Single-mode: ELR-20-AC, ELR-30-AC, ELR-50-AC, & ELR-50-WC

The Thulium fiber laser (TLR Series), operating in the 1900-2050 nm wavelength range, offers output powers up to 120 Watts. Typical industrial applications include plastic cutting and marking, non-metal materials processing and solid state IR laser pumping.

AVAILABLE MODELS: Single-mode: TLR-50-AC, TLM-50- WC, TLR-100-AC, TLM-100-WC

Multi-mode: TLR-50-MM-AC, TLM-50-MM-WC, TLR-100-MM-AC, TLM-100-MM-WC, TLR-200-MM-WC

QCW SERIES

Quasi-CW Ytterbium Fiber Lasers

QCW LASER CONFIGURATIONS



Applications

- Cutting
- Drilling
- Welding



Efficiency

- Over 30% Wall Plug Efficiency
- Industry Leading Diode Lifetime



Capabilities

- Long Pulse Operation
- Plug & Play Design
- Maintenance-free Design



Standard Features

Quasi-continuous wave (QCW) fiber lasers are ideally suited for numerous industrial applications requiring a long pulse duration and high peak power such as spot welding, seam welding and drilling. Designed to displace existing YAG lasers due to their minimal maintenance costs and low upfront costs, the QCW is easily able to be retrofitted into most existing systems.



YLM Module



YLR Rackmount



YLS System

- OEM Module design. Air-cooled cabinet with Analog/ RS-232/ and Ethernet control interfaces.

Rack mountable housing. Air-cooled cabinet with touch-screen display. Analog/ RS-232/ and Ethernet interfaces included.

Ytterbium Fiber Laser System. Lasernet/ Analog/ RS-232/ and Ethernet interfaces included.

- 4U Rack Dimensions available on page 6
- 6U Rack

- Air-cooled NEMA Housing.
- Water-cooled NEMA 12 Housing.

QCW LASER PART NUMBERS

	CW	PEAK	FEEDING FIBER	ENCLOSURE
	OUTPUT POWER (WATTS)			W X D X H (mm)
• YLM-150/1500-QCW-AC	150 W	1,500 W	Single mode	OEM Module, 264 x 432 x 150
• YLM-150/1500-QCW-MM-AC	150 W	1,500 W	50, 100 or 200 μ m	OEM Module, 264 x 432 x 150
• YLM-300/3000-QCW-MM-AC	300 W	1,500 W	50, 100 or 200 μ m	OEM Module, 336 x 432 x 150
• YLR-150/1500-QCW-AC	150 W	1,500 W	Single mode	4U Rack mount, 449 x 503 x 177
• YLR-150/1500-MM-AC	150 W	1,500 W	50, 100 or 200 μ m	4U Rack mount, 449 x 503 x 177
• YLR-300/3000-QCW-MM-AC	300 W	3,000 W	50, 100 or 200 μ m	6U Rack mount, 448 x 502 x 266
• YLS-300/3000-QCW-AC	300 W	3,000 W	50, 100 or 200 μ m	NEMA housing, 804 x 604 x 605
• YLS-450/4500-QCW-AC	450 W	4,500 W	50, 100 or 200 μ m	NEMA housing, 804 x 604 x 605
• YLS-600/6000-QCW-AC	600 W	6,000 W	50, 100 or 200 μ m	NEMA housing, 804 x 604 x 605
• YLS-900/9000-QCW-WC	900 W	9,000 W	100, 200 or 300 μ m	12U NEMA 12 Housing, 558 x 790 x 815
• YLS-1200/12000-QCW-WC	1,200 W	12,000 W	100, 200 or 300 μ m	12U wide NEMA 12 Housing, 1186 x 856 x 806
• YLS-1500/15000-QCW-WC	1,500 W	15,000 W	100, 200 or 300 μ m	12U wide NEMA 12 Housing, 1186 x 856 x 806
• YLS-1800/18000-QCW-WC	1,800 W	18,000 W	100, 200 or 300 μ m	12U wide NEMA 12 Housing, 1186 x 856 x 806
• YLS-2000/20000-ACW-WC	2,000W	20,000W	100, 200 or 300 μ m	12U wide NEMA 12 Housing, 1186 x 856 x 806

YLP SERIES

Pulsed Fiber Lasers

YLP LASER CONFIGURATIONS



Applications

- Ablating
- Deep Engraving
- Cutting
- Marking
- Texturing
- Surface Treatment



Efficiency

- Over 30% Wall-plug Efficiency
- Industry Leading Diode Lifetime



Capabilities

- High Peak Powers
- Large Range of Output Powers
- Maintenance-free Design



Standard Features



The YLP Series are maintenance-free MOPFA and Q-switched pulsed Ytterbium fiber lasers designed for OEM applications. Collimated, isolated and then typically focused to a spot size of a few microns or less, the near diffraction-limited beam can mark, drill or machine a variety of materials.

IPG's Q-switch fiber lasers are available in several different power ranges and pulse durations, with average powers up to 500 watts and peak powers up to 150 kilowatts. These compact fiber lasers feature low divergence and can provide the fluency required for high speed marking of both plastics and metals.

YLPN SERIES: NANOSECOND FIBER LASERS

IPG's nanosecond fiber lasers are the core products for most industrial materials processing needs. Available in a multitude of different configurations, output powers, pulse durations and terminations, the YLPN Series has the versatility needed for multiple applications.

YLP-HP SERIES

High Power Q-switch fiber laser system. Rack mounted housing, front panel control. 1-10 mJ Pulse Energies. 6-9 mm beam diameter.

YLP SERIES

Basic Q-switch fiber laser module, high contrast, air-cooled. 0.5-1 mJ Pulse Energy. 6-7 mm beam diameter.

YLP-RA SERIES

Q-switch fiber laser module w/ remote amplifier. Air-cooled. 0.5-1 mJ Pulse Energy. 3-4.5 mm beam diameter

YLPN SERIES

Q-switch fiber laser module w/ selectable output, bitstream control and extended PRR. Air-cooled. 0.3-1 mJ Pulse Energy. 10 & 20 W: 6-9 mm beam, 18 W: 2 mm beam diameter

YLP-V2 SERIES

Q-switch fiber laser module with bitstream control and extended PRR and high contrast. Air-cooled. 1 mJ Pulse Energy. 6-9 mm beam diameter.



YLPN SERIES: PICOSECOND FIBER LASERS

IPG's short picosecond fiber lasers provide high peak power with scalable average output power of 30 W and short pulse duration of 10-20 ps at full operational frequency range of 20-3000 kHz. The all fiber format allows for the adjustment of peak power and/or pulse repetition rate without affecting any of the output beam parameters. It is ideal for applications in micromachining, solar/photovoltaic arena, via hole drilling, resistor trimming and marking of transparent materials.

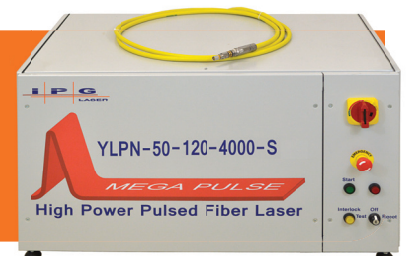
YLPF SERIES: FEMTOSECOND FIBER LASERS

IPG Photonics' YLPF Series femtosecond fiber lasers provide high peak power with scalable average output power of 10 W, short pulse duration of 500 fs at full operational repetition rate range of 20-3000 kHz. The all fiber format allows for the adjustment of peak power and/or pulse repetition rate without affecting any of the output beam parameters. It is ideal for applications in ophthalmology, life sciences and precision micromachining. The excellent beam quality, ultrashort pulse duration and high pulse energy combine to provide peak power densities suitable for micromachining virtually any material: metal, glass, ceramic, silicon, plastics. The ultrashort pulse duration results in very small heat affected zone.



NEW! YLPN-50-120-4000-S: MEGAPULSE YTTERBIUM LASER

IPG Photonics' new high power, pulsed fiber laser is designed with an average output power of 4 kW at the work piece, a pulse energy of 40 mJ and a pulse duration of 120 ns. With a wall-plug efficiency of 30%, a variety of fiber delivery options, a small form factor and maintenance-free operation, IPG's new high power pulsed laser is ideally suited to surface preparation and treatment, laser ablation and laser surface cleaning- a process that can be carried out without abrasives, solvents and chemicals.



GREEN SERIES

CW & Pulsed 532 nm Fiber Lasers

GLR & GLP CONFIGURATIONS



Applications

CW/ QCW GREEN

- Annealing
- Additive Manufacturing
- Cutting
- Soldering
- Welding

PULSED GREEN

- Ablating
- Cutting
- Deep Engraving
- Drilling
- Marking



Efficiency

- Over 30% Wall-plug Efficiency
- Industry Leading Diode Lifetime



Capabilities

- High Brightness
- Compact & Efficient



Standard Features

Fiber Lasers in the green spectrum range enable IPG to serve new markets and applications. At output wavelengths of 532 nm, the new pulsed green fiber laser and continuous wave (CW) green fiber laser provide the high single-mode beam quality, ease of use and high reliability that IPG's fiber lasers are known to deliver at lower prices than competitive green lasers.



GLP Module

- OEM Module design. Air cooled laser with Analog/ RS-232/ and Ethernet control interfaces. Single-mode free launch beam output. *Displayed on left.*

GLR Rackmount

Rack mountable housing. Air-cooled cabinet with touch-screen display. Analog/ RS-232/ and Ethernet interfaces included. Single-mode free launch beam output. *Displayed above.*

- 3U Rack
- 4U Rack
- 6U Rack

GLR PART NUMBERS

	MODE	WATTS	COOLING	CABINET DIMENSIONS	HEAD DIMENSIONS W X D X H (mm)
○ GLR-10	CW	10 W	Air	3U Rack mount, 448 x 403 x 132	130 x 45 x 250 (mm)
○ GLR-20	CW	20 W	Air	3U Rack mount, 448 x 403 x 132	130 x 45 x 250 (mm)
● GLR-30	CW	30 W	Air	4U Rack mount, 448 x 503 x 176	130 x 45 x 250 (mm)
● GLR-50	CW	50 W	Air	4U Rack mount, 448 x 503 x 176	130 x 45 x 250 (mm)
● GLPN-100-M	QCW	100 W	Air	OEM Module, 264 x 148 x 384	105 x 60 x 213 (mm)
● GLPN-500-R	QCW	500 W	Water	6U Rack mount, 448 x 700 x 265	105 x 60 x 213 (mm)

Kilowatt class CW green lasers are also available, please contact your nearest sales office for further information.

GLP PART NUMBERS

	MODE	WATTS	COOLING	CABINET DIMENSIONS	HEAD DIMENSIONS W X D X H (mm)
● GLPN-M-10	Q-SWITCH	10 W	Air	OEM Module, 270 x 220 x 86	TBD
○ GLPN-10	Q-SWITCH	10 W	Air	3U Rack mount, 448 x 418 x 133	
○ GLPN-30	Q-SWITCH	30 W	Air	3U Rack mount, 448 x 418 x 133	
○ GLPN-50	Q-SWITCH	50 W	Air	3U Rack mount, 448 x 418 x 133	

PRODUCT SPOTLIGHT

IPG's New Product Releases & Standout Accessories

IPG continues to develop a wide range of products across a broad wavelength range, from continuous wave to ultra-short pulse duration. These new lasers open up new application areas to IPG, and allow the company to provide un-rivalled performance to new markets and industries such as medical, solar and semiconductor. Please contact us for more details on the full range of picosecond and femtosecond lasers.



NEW PRODUCT FEATURE: IPG's GLPN-500-R Green Quasi-CW Laser



IPG Photonics introduces a new green fiber laser with ground-breaking maximum average power of 500 W in a perfectly single-mode output beam. IPG's GLPN-500-R takes advantage of the quasi-CW operation mode to allow for a high-efficiency super compact optical head that does not require any cooling. The optical head is connected to a water-cooled rack-mounted main laser console that houses highly-efficient and reliable fiber amplifier, pioneered by IPG. The result is a rugged industrial-grade high-power green fiber laser with unmatched performance and remarkable wall-plug efficiency. w for easy integration.

In addition, IPG's CW Ytterbium fiber laser modules can be ordered for single-mode operation or with step index fibers from 50 – 200 microns. This allows optimal performance for critical welding, cutting and drilling applications.



Applications

- Solar Cell Manufacturing
- Semiconductor Wafer Annealing
- Laser Shows
- Laser Projectors
- Welding & Cutting of Highly-Reflective Materials



Standard Features

- 532 nm Wavelength
- 500 Watt Output Power
- $M^2 < 1.2$ Beam Quality
- 1% Power Stability
- Linear Polarization $> 100:1$
- 2800 W Power Consumption
- Super Compact Head
- Industrial Performance

IPG'S COMPACT LASER SEAM STEPPERS:

A HIGH PRODUCTIVITY, HIGH-EFFICIENCY, CLASS I LASER SAFETY DEVICE; THE IDEAL REPLACEMENT FOR RESISTANCE SPOT WELDING.

IPG Photonics' Compact Laser Seam Steppers (LSS) are the ideal solution for freehand laser welding and as a replacement for resistance spot welding. Presenting two distinct units: the robot or gantry mounted LSS-2 and the hand-operated LSS-3, each stepper offers a unique laser clamping and welding tool that operates laser output powers up to 4000 Watts. With an adaptable clamping force of up to 3 kN and a fixed focal length of 250- 300 mm the LSS allows for a laser wobble seam weld up to 40 mm in length.

- Compact Design: Controller Dimensions (mm) 806 x 856 x 1508
- Up to 4 kW Laser Power with Laser Safety Class I
- Laser Welding with Simple Clamping Technology
- Reduced Processing Time due to Higher Joining Strength
- Compact Laser- and C-gun Control in a Single Housing
- Real Time Welding Quality Control & Data Record of each Welding Seam
- Programmable Clamping with Long-term Repeatability
- Repeatable Processing with Multi-layer Sheet Joining
- Higher Component Strength and Rigidity due to Joint Quality
- Smart Welding Option

LSS-2

The LSS-2 has high beam quality and ideal beam monitoring as well as an integrated protective cover allowing the Class 1 Laser classification. Powerful enough to easily weld even hot-formed materials, the LSS-2 cuts traditional weld speeds in half. Weighing in at only 45 kg, the design is compact and saves compressed air, allowing for operation below 70 dB.



LSS-3

IPG's LSS-3 Compact Laser Hand Seam Stepper represents a new generation of laser seam steppers. With a total weight of just 35 kg, the LSS 3 allows you to make welding seams by hand. The LSS-3 is unique in that it combines a clamping and laser welding tool which operates in power range up to 4 kW.



ACCESSORIES

Developed and Manufactured by IPG

PROVIDING TOTAL SOLUTIONS

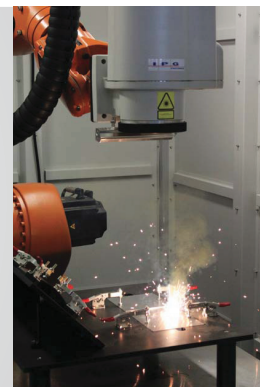
IPG Photonics strives to provide the most comprehensive supply of fiber lasers, and with that, fiber laser solutions. To add to the functionality of the lasers and to enable IPG to provide one-stop service and support for the entire process, IPG manufactures its own line of processing heads, process fibers, collimators and chillers as well as tooling solutions developed from years of experience.



NEW PRODUCT FEATURE: IPG'S HIGH POWER SCANNER

THREE-DIMENSIONAL SCANNER FOR HIGH SPEED CUTTING, MARKING OR WELDING

- Variable Spot Size Control:
Tailor Power Density to Specific Applications
- Stationary, Synchronized & Mark-on-the-fly Robotic Applications
- Optional CCD Camera Attachment
- Maximum Processing Speed: 2 m/s
- 50 mm Clear Aperture
- 100 micron Fiber, Produces 450-750 μm Focused Spot
- Magnification: 4.5x - 7.5x
- Offset Drift: 10 micro radians/ $^{\circ}\text{C}$
- Gain Drift: 35 PPM/ $^{\circ}\text{C}$
- Operating Temperature: 0-50 $^{\circ}\text{C}$, Water-cooled optics
- Universal Input Voltage
- Industry Standard XY2-100 Control Interface
- Scanning Head Dimensions: 300 x 320 x 550 mm



DELIVERY OPTICS

D12.5

(Up to 3 kW use)

Compact Coupler, D12.5	P30-002126
Compact Shutter, D12.5	P30-002282
Compact 2-way Beam Switch, D12.5	P30-002125
Compact 4-way Beam Switch, D12.5	P30-002381

Optics listed are configured with IPG's standard HLC-8 (QBH compatible) connectors. LCA connectors (Automotive, QD style) and D50 part numbers are available upon request.

D25

Standard Coupler, D25	P30-001018
Standard Shutter, D25	P30-001352
Standard 2-way Beam Switch, D25	P30-001155
Standard 2-way Beam Splitter, 50:50, D25	P30-001400
Standard 3-way Beam Switch, D25	P30-001772
Standard 4-way Beam Switch, D25	P30-001156
Standard 4-way Beam Splitter, 50/50, 100/100, D25	P30-001397
Standard 4-way Beam Splitter, 50/50, 50/50, D25	P30-001662
Standard 6-way Beam Switch, D25	P30-001157

PROCESS FIBER PART NUMBERS (HLC-8 Connectors)

Custom lengths and diameters can be special ordered for process fibers.

LENGTH	100 μm	150 μm	200 μm	300 μm	400 μm	600 μm
10 meters	P45-002223	P45-002565	P45-002399	P45-002597	P45-003236	P45-003364
20 meters	P45-001914	P45-002756	P45-002171	P45-002510	P45-003163	P45-003164
30 meters	P45-002316	P45-002592	P45-002325	P45-002596	P45-003413	P45-003540

ADAPTABLE COLLIMATORS (HLC-8 Connectors)

FOCAL LENGTH	D25, Air-cooled	D25, Water-cooled	FOCAL LENGTH	D50, Air-cooled	D50, Water-cooled
F50	P30-001459	P30-001354	F100	P30-001470	P30-001298
F60	P30-001460	P30-001214	F120	P30-001471	P30-001277
F70	P30-002387	P30-002384	F160	P30-001479	P30-001276
F85	P30-001461	P30-001342	F180		P30-001433
			F200		P30-001337

All accessories listed are configured with IPG's standard HLC-8 (QBH compatible) connectors. LCA connectors are also available upon request depending on product. Please contact your salesperson for any additional configurations or options that may not be listed above. Part numbers, configurations and availability subject to change.

PROCESSING HEADS

Cutting & Welding Heads for Fiber Lasers



Standard Features

IPG Photonics has revolutionized the cutting and welding industry, providing customers with reliable, compact and energy efficient fiber lasers. IPG now offers a range of optical heads to accompany its fiber lasers including the FLW-D30 and FLW-D50 welding heads and FLC-D30 cutting head.

The FLW-D30 and FLW-D50 welding heads have multiple features, including vertical or horizontal configuration, real time contamination monitoring functionality, camera options, fine focus adjustment and wide range of collimator and focus lens options, all packaged in a small, lightweight form, that weighs as little as 1.5 kg for the D30 and 2.5 kg for the D50. Available with a broad range of accessories including air-knife, gas assist/plume suppression, coaxial nozzle and angular mounting plate, IPG's welding heads can be configured the way you want.

The FLC-D30 cutting head is designed with an extremely low weight to keep the moving mass on cutting systems as low as possible. With constant height sensing and integrated electronics to monitor cover slide presence and contamination, the FLC-D30 is providing constant feedback. Supplied in straight or right angled configurations, with the broadest focus and collimator lens configurations available on the market, the FLC-D30 together with IPG's fiber lasers provides the perfect cutting solution.



FLC-D30 Vertical Configuration

FLC-D30

■ P30-002788

Base Part #
FLC-D30 Cutting Head

Example:

P30-002788-A4B1:

FLC-D30 Vertical Cutting Head with Manual Focus
100 mm Collimator
200 mm Focus
HLC-8 Fiber Receiver

A

Vertical

B

Horizontal

1

50 mm

2

60 mm

3

85 mm

4

100 mm

A

125 mm

B

200 mm

C

250 mm

1

HLC-8
(QBH type)

2

LCA
(QD type)

▼ D30 Cutting Head Accessories

- Camera Arm Assembly: [P30-002424](#)
- Cover slides: [P45-005047](#)
- Cutting Nozzles:

Cutting Head Electronics

Motorized option with pierce detection

Monitoring for cover slide presence and contamination

Height sensor maintains constant distance to work piece

Integrated back reflection monitoring



■ Thick Nozzles

Diameters Available

- 1.0 mm tip
- 1.2 mm tip
- 1.5 mm tip
- 2.0 mm tip
- 2.5 mm tip

IPG Part #

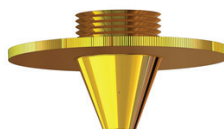
[P40-003805-002](#)

[P40-003805-003](#)

[P40-003805](#)

[P40-007070](#)

[P40-007071](#)



■ Thin Nozzles

Diameters Available

- 0.8 mm tip
- 1.0 mm tip
- 1.2 mm tip
- 1.5 mm tip
- 1.8 mm tip
- 2.0 mm tip
- 2.5 mm tip

IPG Part #

[P40-007141-001](#)

[P40-007141-002](#)

[P40-007141-003](#)

[P40-007141-004](#)

[P40-007141-005](#)

[P40-007141-006](#)

[P40-007141-007](#)

■ The Power to Transform®

D30 & D50 WELDING HEADS



FLW-D30 Horizontal Configuration



FLW-D50 Vertical Configuration



Camera Arm Assembly
P30-002424

C-mount extension tube to mount camera.
Precision image position adjustment.
Integrated iris. Image focus and lock.
Available for all processing heads.

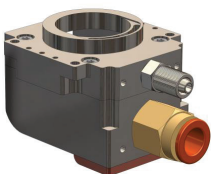
FLW-D30

	Configuration	Collimator	Focus	Fiber Receiver
■ P30-002417 Base Part # FLW-D30 Welding Head	R Horizontal RHS	1 50 mm	A 100 mm E 250 mm	1 HLC-8 (QBH type)
	L Horizontal LHS	2 60 mm	B 125 mm F 300 mm	2 LCA (QD type)
Example: P30-002417-S4E1: FLW D30 Standalone Welding Head 100 mm Collimator 250 mm Focus HLC-8 Fiber Receiver	V Vertical	3 85 mm	C 150 mm G 500 mm	
	S Standalone	4 100 mm	D 200 mm	

FLW-D50

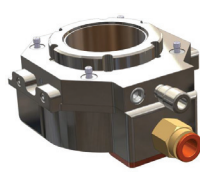
	Configuration	Collimator	Focus	Fiber Receiver
■ P30-002418 Base Part # FLW-D50 Welding Head	R Horizontal RHS	1 100 mm	A 150 mm G 600 mm	1 HLC-8 (QBH type)
	V Vertical	2 120 mm	B 200 mm H 700 mm	2 LCA (QD type)
Example: P30-002418-V4F1: FLW D50 Vertical Welding Head 160 mm Collimator 500 mm Focus HLC-8 Fiber Receiver	S Standalone	3 140 mm	C 250 mm I 800 mm	3 HLC-16 (FCH-16)
		4 160 mm	D 300 mm J 900 mm	
		5 180 mm	E 400 mm K 1000 mm	
		6 200 mm	F 500 mm	

▼ Welding Head Accessories



Air-knife with Purge
P30-002163

Integrated purge module provides additional protection for cover slide
Gas assist can be attached to serve as plume suppression
FLW-D30 Version



Cross-Jet/ Air-knife
P30-007272

Integrated purge module provides additional protection for cover slide
Gas assist can be attached to serve as plume suppression
FLW-D50 Version



Coaxial Nozzle w/ Purge
P30-002650-XXX

Shield gas is delivered coaxially to the weld site
Telescoping option available.
Suppresses weld plume
Consult IPG Sales for options
Available for FLW-D30.



Gas Assist
P30-002452

Can be attached to air knife or directly to head
Can be used to deliver off-axis shield gas to weld site
Suppresses weld plume
Multiple inputs
Available for FLW-D30 & FLW-D50



Welding Head Alarm Module
P30-007325

Monitors cover slide presence, contamination and temperature as well as mirror temperature
Available for FLW-D30 & FLW-D50

COMPREHENSIVE SERVICES

What you can expect from IPG Photonics



PREMIUM WARRANTY & SUPPORT

IPG stands behind our commitment to our customers with the best warranty in the industry. All IPG lasers listed in this brochure are warranted against defects in materials and workmanship, under normal use, for minimum two years; three years for the YLS family of lasers with extended warranties available up to ten years.

Unlike conventional laser technologies, IPG fiber lasers require no preventive maintenance. As long as output optics and coolant are properly maintained by the customer, the laser will perform consistently without adjustment or intervention by the customer or IPG. This greatly reduces downtime and maintenance costs to the customer. We have a team of dedicated service professionals and technical support specialists worldwide to provide personal and effective customer support.



IPG PHOTONICS WORLD HEADQUARTERS, OXFORD, MA

Customer satisfaction is our goal at IPG. We strive to make the best lasers and amplifiers in the world and back it up with our commitment to service.



EXTENSIVE LASER SOLUTION DEVELOPMENT

IPG Photonics offers free applications development through any of our Materials Processing Centers worldwide. We offer prototyping and feasibility studies to our prospective customers to evaluate fiber lasers for their unique applications. Our knowledge of fiber laser applications can accelerate and improve your application development, from macro machining to micro machining and marking of various materials. Each of our applications labs offers our customers proof of concept, process development, recommendations, consultations, optical metrology, metallurgy, sample processing and an accompanying full results report.

APPLICATION FACILITY FEATURES:

5 Axis Robotics Welding, Cutting, Drilling

5 Axis CNC Welding, Cutting, Drilling

Tube Cutting Systems

CNC 2D Machines

- Cutting, Welding Thick Plate

- High Speed Cutting

- Micromachining with High Accuracy

Galvo Systems

- Marking, Cutting, Welding



APPLICATIONS CENTERS WORLDWIDE

COUNTRY	CITY	LAB FOCUS	PHONE	EMAIL
China	Beijing	Materials Processing	+86-10-6787-3377	application@ipgbeijing.com
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APPLICATIONS REQUEST FORM

Developing Your Laser Solution

PROCESS REQUEST
(PLEASE ATTACH TO SAMPLES)



IPG's Application Facilities are available to perform R&D for proof-of-concept through process development for all materials processing applications; end users and systems integration partners are welcome to visit and work at all facilities.

If you would like IPG to process your application, please complete the fields below and send to your nearest IPG Applications Center. Please contact the site to schedule your work before submitting samples.

COMPANY NAME:

COMPANY ADDRESS:

CONTACT NAME: EMAIL:

TITLE: PHONE:

PART DESCRIPTION:

MATERIAL TYPE & DESIGNATION:

DESCRIBE ANY PRE- OR POST-PROCESS, MATERIAL TREATMENTS/ COATINGS, WHICH MAY INFLUENCE THE APPLICATION:

PROCESS: CUT ☐ WELD ☐ DRILL ☐ OTHER ☐

PRINT ENCLOSED ☐ MSDS ENCLOSED ☐

PRODUCTION PROCESSING REQUIREMENTS: (answer all that apply)

PARTS PER HOUR	<input type="radio"/> inch <input type="radio"/> mm	SURFACE FINISH	<input type="radio"/> inch <input type="radio"/> μm
FEEDRATE	<input type="radio"/> inch <input type="radio"/> mm	KERF WIDTH	<input type="radio"/> inch <input type="radio"/> mm
HOLES/ MIN	<input type="radio"/> inch <input type="radio"/> mm	HAZ	<input type="radio"/> inch <input type="radio"/> mm
HOLE DIA.	<input type="radio"/> inch <input type="radio"/> mm	RECAST	<input type="radio"/> inch <input type="radio"/> mm
WELD DEPTH	<input type="radio"/> inch <input type="radio"/> mm	DIMENSIONAL TOL	<input type="radio"/> inch <input type="radio"/> mm

DESIRED CYCLE TIME:

LASER PREFERENCE: MULTI-MODE ☐ SINGLE-MODE ☐ PULSED ☐

PRIMARY CONCERNS: (assign applicable concerns from 1- 5, 1 being the most important)

SPEED	SURFACE FINISH	TAPER
KERF	HAZ	OTHER (specify)
DEPTH	POROSITY	

CURRENT PROCESS (and/or alternative process being considered)

DESCRIPTION OF CURRENT WORK HANDLER

PROJECT FUNDED? ☐ YES ☐ NO

PLEASE ATTACH ANY ADDITIONAL INFORMATION, SKETCHES, OR COMMENTS TO THIS SHEET AND ATTACH TO PROCESSING SAMPLES.



Sales & Service ■
Development, Sales & Service ■
Manufacturing, Development, Sales & Service ■

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