



**THE POWER TO TRANSFORM®**



**INDUSTRIAL FIBER LASERS**  
FOR MATERIALS PROCESSING



## LEADER IN INNOVATION



IPG Photonics World Headquarters, Oxford MA, USA

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

We are the only company that controls the performance, cost and yield of both active fibers and semiconductor pump diodes - the core technology of our fiber laser and amplifier products. Additionally, we developed and

manufacture our own process fibers, beam couplers and switches, collimators, chillers, and most recently both cutting and welding processing heads as well as fully custom laser systems. This innovation coupled with our 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.*

## HIGH POWER FIBER LASERS

### ***A Unique Combination of the Most Advanced Technologies***

High power fiber lasers are created from active optical fibers and semiconductor diodes, a merger between two of the most innovative and advanced laser technologies. Fiber lasers use single emitter semiconductor diodes as the light source to pump the active fibers. The laser beam emitted is contained within optical fibers and delivered through an armored flexible cable. Active fibers, special optical fibers doped with rare earth ions, allow for an extremely bright light from a very small core, thus making possible the production of kilowatt class output with excellent beam quality. IPG uses many proprietary technologies to create the undisputed best beam quality kilowatt class lasers available in the market today.

The combination of technologies results in a unique, highly reliable and superior performing laser system with parameters exceeding any traditional laser technology, including disc, rod, YAG or CO<sub>2</sub> lasers. Our robust fiber lasers share common attributes of compact size, long diode life, low maintenance operation, high wall-plug efficiency and completely consistent beam divergence and beam profile at all power levels.



IPG's own high-power semiconductor Diodes



Diode burn-in facility



Open laser chassis displaying the modular design of high power fiber lasers



Post-production fiber lasers

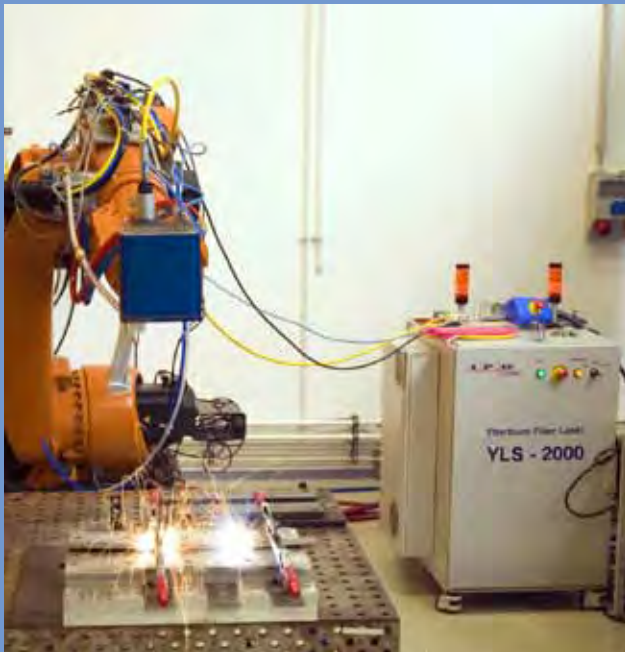


# FIBER LASER ADVANTAGES

## *What You Can Expect from an IPG Laser*

Our low-order-mode kilowatt class fiber lasers range in power from 500 W to 50 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 welding applications. The units can be supplied with fiber lengths to 100 meters, different fiber diameters and variety of multi-port beam switches, beam couplers, termination optics and scanners.



## 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
- Estimated Diode Lifetime > 100,000 hours
- Integrated Coupler or Beam Switch

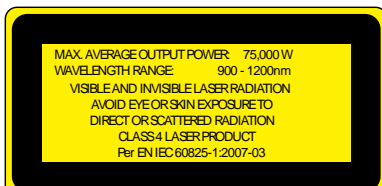
Fiber lasers deliver their energy through an integrated flexible optical fiber. Fiber lasers have a monolithic, entirely solid state, fiber-to-fiber design that does not require mirrors or optics to align or adjust. These features make fiber lasers easier to integrate and operate in production, medical 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.

The fiber laser is modular, built from multiple laser units, each one generating hundreds of watts of output power. This also allows the laser system to incorporate spare modules and power margins. Due to this modularity the YLS series of high power laser is set to operate below the rated current. Thus, in the unlikely event that a module fails the laser will automatically increase the power to the rated output leaving the laser with no output power loss and no halted production. An error message will then alert the user of the specific issue that requires service. This feature also increases the lifetime of the diode because of the reduced output strain therefore increasing the overall life of the laser.



## YLS Series



Product Designation*	YLS-XXXX	YLS-XXXX
Description	Compact kW Fiber Laser System	kW Class Fiber Laser System
Standard Features	Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode	Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode
Available Operating Modes	CW, QCW, SM	CW, QCW, SM
Available Output Power	500 Watts - 2 kW	500 Watts - 50 kW
Feed Fiber Diameter*	Available in single-mode, 50, 100, 200 or 300 $\mu$ m diameter	Available in single-mode, 50, 100, 200 or 300 $\mu$ m diameter, options dependant upon power
Wall-plug Efficiency	>30%	>30%
Output Termination Options	HLC-8 (QBH type) & LCA (QD type)	HLC-8 (QBH type), HLC-16, & LCA (QD type)
Ancillary Options	External coupler, external 1x1, 1x2, 1x4 or 1x6 beam switch or external 50:50 beam splitter	Internal coupler, internal 1x1, 1x2, 1x3 or 1x4 beam switch or internal 50:50 beam splitter. External 1x6 beam switch
Air Conditioner	Standard	Standard
Interface	Standard: LaserNet, Digital I/O, Analog Control Additional Options: DeviceNet, Profibus or Ethernet	Standard: LaserNet, Digital I/O, Analog Control Additional Options: DeviceNet, Profibus or Ethernet
Laser Cabinet Style/ Dimensions	12U Standalone NEMA 12 Enclosure (HxWxD, mm) 558x790x815	1-4 kW: 25U Standalone NEMA 12 Enclosure (HxWxD, mm) 1106x856x806 5-10 kW: 31U Standalone NEMA 12 Enclosure (HxWxD, mm) 1400x856x806
Reserve Module	Available option for <2 kW, Standard on 2 kW	Available option for <2 kW, Standard on 2 kW+
Modulation		
Upgradeable	Yes, maximum 2 kW	Yes, 25U cabinet max 4 kW, 31U max 10 kW

## SYSTEM NOMENCLATURE

When ordering an IPG Fiber Laser System, if any optics are internal to the system or the chiller is affixed, the part number of the system will change accordingly. Below is a small sampling of possible configurations and what the resulting part number would be. Note that the numerics are based out power output. Information on our optics is available on the following page.

Cabinet	Power	Direct Feed Fiber	Internal Coupler	Internal 1x1 Switch	Internal 1x2 Switch	Internal 1x3 Switch	Internal 1x4 Switch	Internal 1x2 Beam Splitter	Affixed Chiller no Optics**	Affixed Chiller with Optics**
6U Rack Mount	≥1,000 Watts	YLR-1000-MM-WC	NA	NA	NA	NA	NA	NA	YLR-1000-MM-WC-TR	NA
12U NEMA 12 Enclosure	≥2,000 Watts	YLS-2000	NA	NA	NA	NA	NA	NA	YLS-2000-TR†	NA
25U NEMA 12 Enclosure	≥4,000 Watts	YLS-4000	YLS-2000-CT	YLS-2000-S1T	YLS-2000-S2T	YLS-2000-S3T	YLS-2000-S4T	YLS-2000-SS2T	YLS-2000-TR†	YLS-2000-XX-TR**
31U NEMA 12 Enclosure	4,000-10,000 Watts	YLS-10000	YLS-10000-C	YLS-10000-S1	YLS-10000-S2	YLS-10000-S3	YLS-10000-S4	YLS-10000-SS2	YLS-6000-TR**	YLS-6000-XX-TR*

\*X denotes optics initialism, i.e. 2 kW with 1x2 switch and chiller would be YLS-2000-S2T-TR

\*\*Only available in up to 6 kW, not available in 3 kW.

† Maximum 2kW in 25U for TR configuration.

# CW FIBER LASERS

## YLS-TR Series

## YLR Series



YLS-XXXX-TR	YLR-XXXX
kW Class Fiber Laser System with internal cooling	Rack mount Fiber Laser Module
Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode, affixed chiller with dual cooling lines	Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode, air cooled units available in up to 500 Watts.
CW, QCW	CW, QCW, SM
1 - 2kW and 4 - 6 kW	10 Watts - 1 kW
Available in 50, 100, 200 or 300 $\mu$ m diameter	Available in single mode, 50 ,100, 200 or 300 $\mu$ m diameter
Variant dependent upon chiller size	>30%
HLC-8 (QBH type) & LCA (QD type)	Affixed collimator, HLC-8 (QBH), or LCA (QD)
Internal coupler, internal 1x1, 1x2, 1x3 or 1x4 beam switch or internal 50:50 beam splitter. External 1x6 beam switch	Compact coupler or direct feed to termination
Standard	Not Available
Standard: LaserNet, Digital I/O, Analog Control Additional Options: DeviceNet, Profibus or Ethernet	Touchscreen Front Panel, RS-232, Digital I/O, Analog Control
1-2 kW: 25U Standalone NEMA 12 Enclosure (HxWxD, mm) 1106x856x806 4-6 kW: 31U Standalone NEMA 12 Enclosure (HxWxD, mm) 1400x856x806	500 - 1000 Watts: 6U Rack mount Enclosure (HxWxD, mm) 266x448x650 <500 Watts housed in either 3U or 4U rack mount design, dependant upon output power
Available option <2 kW, Standard on 2 kW+	Not Available
Yes, 25U cabinet max 2 kW, 31U max 6 kW	No

## LASER CLASSIFICATIONS

Each classification of high power fiber laser serves a targeted application demographic. The most versatile and customizable option within the product line is the YLS series fiber laser. 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. Housed in a NEMA 12, air conditioned and sealed cabinet, these systems are designed to operate in industrial manufacturing environments. They have garnered wide acceptance in the very demanding automotive, aerospace and oil and gas industries, many requiring multiple shifts operating.

Replicating the versatility of the YLS series, the YLS-TR comes bundled with a compatible chiller or heat exchanger. Additionally, the TR Series has the added feature of dual cooling lines: one directly to the laser, the other cycling warmer water to the external optics, thus reducing condensation which is especially advantageous in warmer climates.

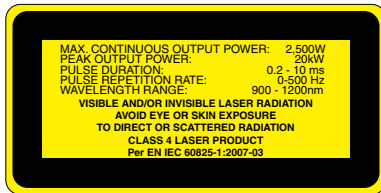
With the most compact design, the YLR laser is offered as a cost-effective, adaptable solution for a clean room system or for integration into a production line. Directly terminated to a QBH-type connector (HLC-8) with numerous feed fiber lengths and diameters available, the rack mount configuration is ideal for a multitude of applications from cutting, welding and drilling to medical device manufacturing.

\*Product designation is relative based on desired wattage and configuration. If a 3 kW system with an internal coupler is desired, the part # designation will be "YLS-3000-CT". Likewise the addition of an internal 1x2 switch will have the "-S2T" or "-S2" notation depending on the location of the switch on the cabinet. Please see YLS Nomenclature chart for reference.

- Please consult IPG Sales for full information regarding high power YLS (Ytterbium Laser Systems) over 10 kW and low power YLM (Ytterbium Laser Modules).

"XXXX" denotes output power in Watts.

## OEM & Integrator Models



Product Designation*	YLM-XXX/XXXX-QCW		YLR-XXX/XXXX-QCW	
Description	Quasi-CW Ytterbium Fiber Laser		Rack mounted Quasi-CW Ytterbium Fiber Laser Module	
Standard Features	Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode. Available with single mode or multi mode feed.		Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode. Available with single mode or multi mode feed.	
Available Operating Modes	Pulsed/ CW (Multi-mode or single-mode)		Pulsed/ CW (Multi-mode or single-mode)	
Available Output Power (Watts)	CW	PEAK	CW	PEAK
	150	1,500	150	1,500
	300	3,000	300	3,000
Feed Fiber Diameter*	Available in single-mode, 50, 100 or 200 $\mu$ m diameter		Available in single-mode, 50, 100 or 200 $\mu$ m diameter.	
Output Termination Options	Affixed collimator, HLC-8 (QBH type) or LCA (QD type)		HLC-8 (QBH type) & LCA (QD type)	
Ancillary Options	Compact coupler or direct feed to termination		Compact coupler or direct feed to termination	
Cooling	Air-cooled		Air-cooled	
Interface	Analog/ RS-232/ Ethernet		Touchscreen Front Panel, RS-232, Digital I/O, Analog Control	
Cabinet Style/ Dimensions	Compact module, 264x432x150 mm		150 Watt CW in 4U 19" rack mount, 449x503x177 mm 300 Watt CW in 6U 19" rack mount, 449x503x266 mm	



# QCW FIBER LASERS

## High Power Systems



## LASER CLASSIFICATIONS

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 retrofit into most existing systems.

The most versatile option within the product line is the YLS series for the QCW. Developed as a complete system the YLS-QCW is designed to operate in industrial manufacturing environments. This design features a robust NEMA 12 housing as well as the interface control to handle multi-port optics for switching or shearing the beam. Available in an air-cooled design up to 600 Watts CW or water-cooled up to 1,500 Watts CW, the YLS-QCW is the most adaptable solution for your processing needs.

The YLR-QCW is ideally suited for lower power processing and another great solution to retrofit existing YAG technologies. The YLR model is easily conformable due to its simple interface, compact design and cost-effective price.

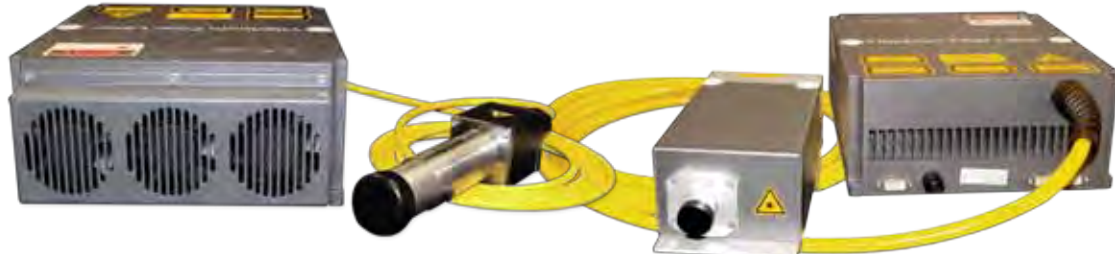
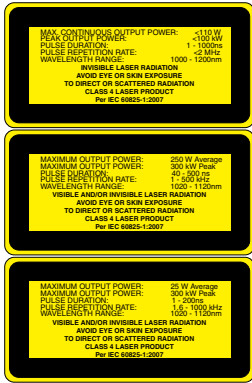
YLM-QCWs are the integrator's ideal answer for creating a superlative processing machine. The modular design allows the integrator to minimize upfront cost due to the negligible IPG controls thus allowing the user to customize their own interface and enabling overall command of the integration of the set laser.

YLS-XXX/XXXX-QCW		YLS-XXX/XXXX-QCW-WC	
Quasi-CW Ytterbium Fiber Laser System		High Power Quasi-CW Ytterbium Fiber Laser System	
Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode, affixed chiller with dual cooling lines		Randomly polarized, 1070-1080 nm emission wavelength, ytterbium doped, red aiming diode	
Pulsed/ CW (Multi-mode only)		Pulsed/ CW (Multi-mode only)	
CW	PEAK	CW	PEAK
300	3,000	900	9,000
450	4,500	1,200	12,000
600	6,000	1,500	15,000
Available in 50, 100 or 200 $\mu$ m diameter		Available in 100, 200 or 300 $\mu$ m diameter, dependant upon output power.	
HLC-8 (QBH type) & LCA (QD type)		HLC-8 (QBH type) & LCA (QD type)	
Compact coupler, internal 1x1, 1x2, 1x3 or 1x4 beam switch or 50:50 beam splitter.		Compact coupler, internal 1x1, 1x2, 1x3 or 1x4 beam switch or 50:50 beam splitter.	
Air-cooled or water-cooled		Water-cooled, chiller required	
Standard: LaserNet, Digital I/O, Analog Control Additional Options: DeviceNet, Profibus or Ethernet		Standard: LaserNet, Digital I/O, Analog Control Additional Options: DeviceNet, Profibus or Ethernet	
NEMA 12 enclosure, 604x605x804 mm		NEMA 12 enclosure, 558x790x815 mm	

## OEM Models

IPG's line of pulsed fiber lasers are ideally suited for a multitude of industrial applications from laser ablation, marking, trimming, scribing, micro-machining, diamond and silicon cutting, to high speed hole drilling. These compact fiber lasers feature low divergence and can provide the fluency required for high speed marking of both plastics and metals. Featuring a compact optical output with a built-in isolator, these lasers are thus able to mark even highly reflective materials making its versatility unparalleled.

This chart is a representation of the more popular models offered by IPG.  
Additional models are available including pulse energies up to 100 mJ and output powers up to 1 kW.



Product Designation	YLP Series				YLP-RA Series			
Description	Basic Q-switched Laser Module				Q-switched Laser Module with Remote Amplifier			
Standard Features	Compact OEM Module, Collinear Red Guide Beam				Compact OEM Module, Collinear Red Guide Beam			
Operating Mode	Pulsed				Pulsed			
Available Output Powers	Pulse Energy	Pulse Duration	Pulse Repetition Rate	Average Output Power	Pulse Energy	Pulse Duration	Pulse Repetition Rate	Average Output Power
	0.5 mJ	100 ns	20 - 200 kHz	10 Watts	0.5 mJ	20 - 30 ns	20 - 200 kHz	10
	1 mJ	100 ns	20 - 200 kHz	20 Watts	0.5 mJ	20 - 30 ns	40 - 200 kHz	20
	1 mJ	100 ns	30 - 200 kHz	30 Watts	0.5 mJ	20 - 30 ns	60 - 200 kHz	30
	1 mJ	100 ns	50 - 200 kHz	50 Watts	1 mJ	40 - 60 ns	10 - 200 kHz	10
	1 mJ	120 ns	50 - 200 kHz	50 Watts	1 mJ	40 - 60 ns	20 - 200 kHz	20
	1 mJ	120 ns	50 - 200 kHz	50 Watts	1 mJ	40 - 60 ns	30 - 200 kHz	30
Cooling	Air-cooled				Air-cooled			
Output Termination Options	6 - 7 mm beam diameter optical output with built-in isolator				Remote amplifier with 3 - 4.5mm beam diameter optical output with built-in isolator			
Interface	Type B1 Control Interface				Type B1 Control Interface			
Cabinet Style/ Dimensions	Compact laser module, 215x95x286 mm				Compact laser module, 215x95x286 mm Remote amplifier, 240x102x71 mm			
Power Supply	24VDC Main Power Supply				24VDC Main Power Supply			



# PULSED FIBER LASERS

## Industrial Systems

Embodying all the advantages of IPG's fiber laser technology including compactness, high efficiency and reliability at a reasonable price, the 100% solid state design is robust, maintenance-free and requires no consumables.



Color marking with an IPG pulsed laser.



## LASER CLASSIFICATIONS

The YLP Series are maintenance-free MOPA 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.

Similar to the standard YLP series, the YLP-RA has a remote amplifier in place of the standard output which allows for an even higher peak power and a shorter pulse duration. The amplifier features a thermally conductive bottom surface with the option for a heat sink with one fan for even more adaptability.

The YLP-M series are master oscillator power amplifiers, or MOPA lasers, that feature a selectable output. These lasers are constructed with a seed diode allowing for multiple pulse durations. There are two different builds of the MOPA laser; one is the OEM module which is available in either 10 or 20 Watt output power, the other is an 18 Watt MOPA in a 3U industrial chassis which already included the full user-friendly interface and power supply.

The YLP-HP series feature the highest pulse energy and output power of the YLP units. The increased power levels allow you to work more efficiently and use thicker materials. Additionally, due to the low pulse duration the YLP-HP is proficient in processing ablating applications as well due to the minimal damage to the substrate material. Like IPG's other industrial pulsed lasers, this laser is based upon IPG's ultra-reliable pumping technology and comes with a heavy duty optical isolator that improves output pulse stability and eliminates back reflection.

YLP MOPA Series				YLP-HP Series			
MOPA Laser, Selectable Output				Q-switched Rack Mount Fiber Laser			
Two configuration types, Collinear Red Guide Beam				Higher Output Power, Collinear Red Guide Beam			
Pulsed				Pulsed			
Pulse Energy	Pulse Duration	Pulse Repetition Rate	Average Output Power	Pulse Energy	Pulse Duration	Pulse Repetition Rate	Average Output Power
0.5 mJ	4, 8, 14, 20, 30, 50, 100, 200 ns	1.6-1000 kHz	10 Watts	1 mJ	90 - 120 ns	20 - 80 kHz	50 Watts
1 mJ			20 Watts	1 mJ	90 - 120 ns	2 - 100 kHz	100 Watts
				1 mJ	90 - 120 ns	20 - 500 kHz	200 Watts
				2 mJ	150 - 250 ns	5 - 50 kHz	100 Watts
0.06 mJ	1-2, 4-6, 5-12 ns	10-600 kHz	18 Watts	2 mJ	350 - 450 ns	5 - 50 kHz	100 Watts
0.2 mJ		10-200 kHz		2 mJ	550 - 650 ns	5 - 50 kHz	100 Watts
0.3 mJ		20-200 kHz		10 mJ	50 - 70 ns	2 - 50 kHz	200 Watts
				10 mJ	80 - 120 ns	2 - 50 kHz	200 Watts
				10 mJ	160 - 240 ns	2 - 50 kHz	200 Watts
				10 mJ	320 - 480 ns	2 - 50 kHz	200 Watts
Air-cooled				Water-cooled			
6 - 9 mm beam diameter optical output for 10 & 20 Watts, 2 mm for 18 Watt, both with built-in isolator				6 - 9 mm beam diameter optical output with built-in isolator			
10 & 20 Watt have Type B1 as well as RS-232C connectivity. 18 Watt is exclusively RS-232C.				RS-232C Control Interface			
10 & 20 Watt are modules, 233x59x292mm. 18 Watt in 3U Rackmount (pictured above) 449x417x133mm				6U 19" rackmount housing, 482x265x665 mm			
10 & 20 Watt: 24VDC Main Power Supply 18 Watt: 100-240VAC Main Power Supply				100-240VAC Main Power Supply			

IPG does manufacture higher power pulsed lasers than those listed above. Please contact IPG directly to qualify your application. Please contact IPG Sales department for proper part numbers, pricing and configurations. Note that some operating modes are static while others are selectable.

# OPTICAL COUPLING, SWITCHING & SHARING

## Maximizing Your Fiber Laser's Capabilities

The ability to couple light from one fiber to another greatly expands upon IPG's fiber laser functionality. A single laser can be used as a power source for multiple work cells thus reducing the total cost of capital equipment. A multi-port unit offers the option of attaching varied process fibers where each work cell could be operating on a different application; for instance one port could weld with a 300  $\mu\text{m}$  diameter fiber in one cell while another port operates with a 100  $\mu\text{m}$  fiber thus providing power to two workstations from a single laser. In addition to greater functionality, optical coupling also provides for ease of replacement of the process fiber, be it for altering the parameters for an application or in an instance of accidental damage to the fiber. If damage does occur, the main power source stays intact and operational for other channels, thus providing greater protection to the power source.



IPG Photonics' 2 way beam switch



A row of IPG Photonics' optical couplers on display

Available options include either a single port coupler, a multi port beam switch offered in either 2, 3, 4 or 6 channels, a beam shutter (also known as a 1x1 switch, used for increased process speeds) or a 2 port beam sharing function with the additional option of 100% full power in one port. Each component is available in a multitude of configurations depending on the chosen power source, series and the size of the component. Up to 4 ports can be integrated internally in the YLS series with

either top or side mount depending on the cabinet. External optical ports have the added option of a long stand-off distance for remote installation on the work floor for greater flexibility and convenience. Though the beam sharing function is only available as a 2 port system it can also be combined with the multi-port beam switch for even greater capabilities. While typically configured with QBH compatible HLC-8 connectors, IPG is now offering QD compatible LCA bayonets and adaptors and HLC-16 connections as well.

Depending on the power level, feeding fibers are available in either a 10, 50, 100, 200 or 300  $\mu\text{m}$  diameter featuring unbeatable beam quality in comparison with solid-state lasers. The beam can be switched to any channel from any position within 50 ms. A state of the art safety system constantly monitors the position of mirrors, fiber interlocks, scattered light inside beam switch cavities, water flow for optical connectors and other important parameters. We manufacture all of our optical couplers, beam switches and beam splitters as well as process fibers. Process fibers are available in 100, 150, 200, 300, 400, 600, 800 or 1,000  $\mu\text{m}$  diameter with lengths up to 100 meters. Available with either HLC-8, HLC-16 or LCA connectors.

## IPG HP COLLIMATORS

IPG's line of collimators are available in both D25 and D50 from 60 to 200 mm in focal length. The collimators are available with either water-cooled or air-cooled optics, an adjustable focus and are QBH-type HLC-8 adapted for easy connection to any of our feed or process fibers. Available collimators: D25-F60, D25-F85, D50-F100, D50-F120, D50-F160 & D50-F200; note: air-cooled not available in D50-F200.



IPG Photonics' D25 & D50 water-cooled and air-cooled collimators

# LASER CONTROL SOFTWARE

## *Interface Options and Abilities*

IPG fiber lasers feature the most up to date control functions requested by the industry. Interfaces such as Profibus, DeviceNet, Industrial Ethernet or simple digital I/O make integration with complex equipment straightforward and easy to use. All laser parameters and available peripherals such as a multi-channel beam switch, chiller, guide laser, power supply, etc. are constantly monitored and controlled by an internal computer and can be remotely accessed at any time. A convenient graphical user interface can be installed on any customer PC. In addition, IPG's fiber lasers have conventional interfaces such as analog control and direct modulation. Response time to these signals is less than 50 microseconds which is crucial for applications with on-the-fly adjustments. Moreover, the laser can store up to 50 different programs with 100 commands each which can be called out with the simple push of a button or via external digital signal.

## CUSTOMER CARE

### *Fast and Professional*

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.

## Applications Processing Centers

### *Developing Your Laser Solution*

IPG Photonics offers free applications development through any of our seven Materials Processing Centers worldwide. With three US locations: Santa Clara, CA, Novi, MI, and Oxford, MA, as well as 4 international locals: Burbach, Germany, Moscow, Russia, Milano, Italy and Beijing, China, our applications developers are there to provide customers with an opportunity to evaluate fiber laser technology for materials processing. 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.







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