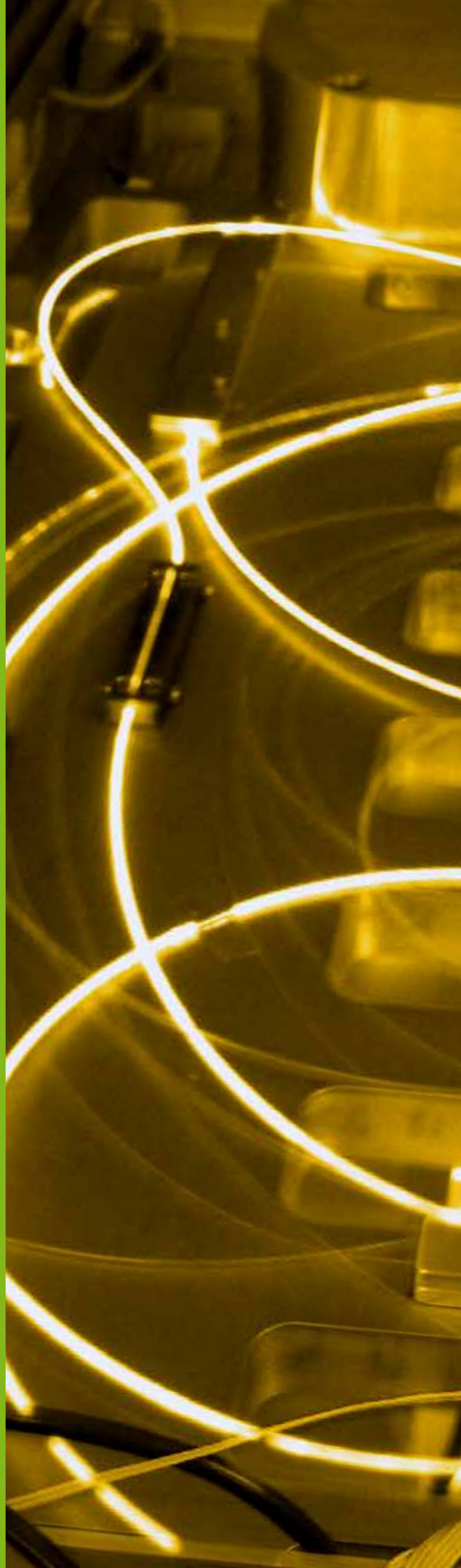


Flexibly Your Laser Partner

Convergent

Lasers
Product Catalog Overview





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Laser material processing

High quality material processing performance of **Convergent Photonics** fiber and CO₂ lasers is primarily a result of:

- Laser beam quality that is optimized for material processing at a competitive speed.
- Laser beam symmetry such that cut is independent of process direction.
- Ability to deliver pulses having fast rise and fall times for example to minimize piercing time in cutting.
- Stable output over time in the environment of the manufacturing facility.

Application Guide

	CS250/ CS450	CF1000	CF2000x/3000/3000x/4000 6000/8000/10000/12000	CD6000	CT6000	CMxx/CXxx
Brazing				X	X	
Cladding			X	X	X	
Cutting		X	X		X	X
Heat Treating			X	X	X	X
Welding		X	X	X	X	X
Additive Manufacturing	X	X				

Pulsing

The piercing performance of the laser is influenced by its pulsing characteristics.

Convergent Photonics lasers give fast (~60microsecond for CO₂ lasers, ~20 microsecond for Fiber lasers) rise time on the pulse that contributes to faster piercing.



*Laser welding titanium alloy using **Convergent Photonics** CM5000 CO₂ laser.*



*3D cutting high strength steel B-pillar using **Convergent Photonics** CF3000 Fiber laser.*

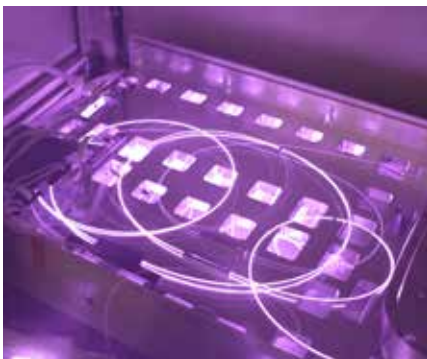
CF SERIES - High Power Industrial Fiber Lasers

Convergent Photonics CF Series fiber lasers are designed to deliver the best performance in material processing to better suit the customer needs. Its modular and robust design is highly efficient and compact with output powers up to **12kW**. The CF series lasers guarantees high reliability, superior performance, and low operational cost with virtually no maintenance required. The lasers are equipped with a patented PLe certified high speed electronic shutter allows high speed shut off and restart of laser processing in a safe manner with no wear out of electronics parts. The CF lasers are very easy to integrate into different machine configurations. In addition, lasers can be configured with an optional FFS (Fiber-Fiber-Switch) which allows the laser to be time shared with multiple workstation processes to maximize efficiencies. The user friendly MMI software is simple to use and continuously monitors the laser performance and records data for analysis.

Back reflection protection

With the growing popularity of fiber lasers in sheet metal cutting and welding applications, users are increasingly aware of one weakness of fiber lasers: vulnerability against back-reflection from the metal work-piece.

Even with high power QBH or QD delivery cables designed to handle kW-level back-reflection stripping from the fiber cladding, back-reflected light couples into the core of the delivery cable which then couples back into the fiber laser. Even with fiber lasers from leading suppliers, through numerous painful lessons, system integrators have learned that laser combiners, and/or modules can be damaged if back-reflection protection is not robust.



Building upon Convergent Photonics' years of experience in high power industrial lasers, the CF Series lasers have incorporated **cutting-edge back-reflection prevention techniques** suitably distributed through-out the laser. The coupled back-reflection is stripped through proprietary mode-stripping techniques, and allowing dissipation of unwanted light and monitored through advanced quick sensor detection, at critical points in the laser.

These sophisticated back-reflection techniques have also been tested, and their robustness demonstrated, in -kW level fiber amplifiers that are much more sensitive to back reflected light. Incorporating these back reflection protection schemes in the CF Series fiber lasers has resulted in unparalleled performance in cutting and welding a variety of highly reflective metallic material.

Specifically, CF laser systems incorporating these protection schemes have been demonstrated to be tolerant to positional offsets from the focal position, during extensive cutting trials in brass and copper. CF lasers have exhibited virtually no false-faults or reliability issues when operating with this unique, proprietary protection scheme.

HTC – High Thickness Cutting option

This patent pending option is available on all CF lasers with power levels higher than 6kW. Its function is to improve cutting qualities of thick mild steel, stainless steel and aluminum materials while still having the ability maintaining the high cut quality of thin materials. This feature is externally controlled and consists of an internal device, which can change the lasers BPP between two pre-determined values, which are optimized for both thin and thick materials.



CF1000



CF1000

Features of CF1000 fiber laser are:

- Flexible laser beam delivery, up to 10 m standard delivery fiber length
- High electro-optical efficiency, up to 32% wall-plug efficiency
- High peak energy in pulsed mode
- Simple, compact, maintenance free and robust design

CF2000x - CF3000x

CF2000x and CF3000x are the perfect solutions for those applications requiring fiber laser sources with a good price/performance ratio.

Main features:

- Highly resistant to back-reflection, compatible with all metal materials including copper and brass
- Cost-effective System
- Rugged and easy to install
- Maintenance -free operation



CF2000x CF3000x

CF3000 - CF4000 - CF6000 - CF8000 - CF10000 - CF12000

CF3000

CF4000

CF6000

Main features:

- Flexible laser beam delivery, up to 30 m delivery fiber length
- High electro-optical efficiency, over 30% wall-plug efficiency
- Patented high speed electronic shutter [200 ms]
- Highly resistant to back-reflection, compatible with all metal materials including copper and brass
- Simple, compact, maintenance free and robust design
- Optimized beam profile for both thin and thick sheet metal cutting and welding
- HTC option available for CF6000 - CF8000 - CF10000 - CF12000



CF4000 Fiber Laser

CF8000
CF10000
CF12000



CF10000 Fiber Laser

CF lasers metal cutting typical capabilities are given below. Real performances also depend on beam delivery system and cutting head design.

Max Cutting Capability (thickness value in mm)

	CF1000	CF2000(x)	CF3000(x)/4000	CF6000	CF8000	CF10000	CF12000	CT6000
Mild Steel	10	15	20	25	25	25	25	20
Stainless Steel	4	8	12	25	25	30	30	12
Aluminum	4	6	8	30	30	30	30	8
Copper	3	4	5	10	10	10	10	5
Brass	3	4	5	10	10	10	10	5



Fiber Lasers – Technical Specifications

		CF1000	CF2000X	CF3000X	CF3000
Nominal Output Power		1000W	2000W	3000W	
Power Range		150-1050W	200-2000W	300-3000W	300-3150W
Power Stability		Typ. ± 1%			
Pulsing Frequency		0 - 5 kHz			
Wavelength		1070nm - 1080nm			
Polarization		Random			
Beam Parameter Product (1/e ²)		1 mm*mrad or 2 mm*mrad	2.7 mm*mrad - 3.4 mm*mrad		
Feeding fiber core diameter		20 or 50 µm	100 µm		
Feeding fiber length		5 m or 10 m	20 m or 25 m or 30 m		
Minimum bend radius		100 mm	200 mm		
Output connector		QBH			
Electronic Shutter On/Off Time		200 ms			
Safety		PLd	PLe		
Diode Pointing Laser		Wavelength 635/658 nm Power <1 mW			
Electrical Power Consumption		6 kW - 6.5 kW EOL (chiller included)	6.6 kW - 7.5 kW EOL	10 kW - 12 kW EOL	
Voltage		200/400/480 Vac 3P	360/510 Vac 3P		
Operating Environment (min/max)		5° C / 50° C			
Relative Humidity		< 95% non-condensing			
Laser Cooling 35% Glycol Mix	Cooling Cap.	Internal chiller	5.5 kW*	9 kW*	
	Pressure		7 bar		
	Flow		20 l/min	35 l/min	
	Temp.		20 ±1 ° C		
Process Fiber Cooling 35% Glycol Mix	Cooling Cap.	Internal chiller supplies the external optics, 0.3 kW	0.3 kW		
	Pressure	3 bar	1.5 bar		
	Flow	3 l/Min	2 l/Min		
	Temp	25° C - 35° C	27° C - 33° C		
Dimensions W x H x L		600 x 1000 x 120 mm	600 x 1000 x 900 mm		1035 x 1125 x 830 mm
Weight		400 kg	360 kg		410 kg
External coolant connections		1/2 inch hose barb (x2)	1 inch hose barb (x2)		
Protection Degree (IEC60529)		IP54 (NEMA13 equivalent)**			

* Additional nominal power (2kW, 3kW, 4kW) suggested for power meter cooling during service

**Note: as per IEC 60825-1:2007, EN 60825-1:2007, FDA Regulation 21 CFR Chapter J 1040.10

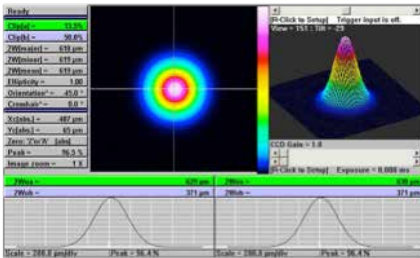
CF4000	CF6000	CF8000	CF10000	CF12000
4000W	6000W	8000 W	10000 W	12000 W
400-4200W	600 - 6300W	800-8000 W	1000-10000 W	1200-12000 W
Typ. ± 1%				
0 - 5 kHz				
1070nm - 1080nm				
Random				
2.7 mm*mrad - 3.4 mm*mrad				
100 µm				
20 m or 25 m or 30 m				
200 mm				
QBH				
200 ms				
PLe				
Wavelength 635/658 nm Power <1 mW				
13 Kw - 16 kW EOL	20 kW - 22 kW EOL	26,7 kW - 29,3 kW EOL	33,3 kW - 36,6 kW EOL	40 kW - 44 kW EOL
360/510 Vac 3P				
5° C / 50° C				
< 95% non-condensing				
12 kW*	14 kW*	18,5 kW*	23 kW*	28 kW*
7 bar				
40 l/min	50 l/min	80 l/min	90 l/min	100 l/min
20 °C ±1 °C				
0.3 kW				
1.5 bar				
2 l/min				
27° C - 33° C				
1035 x 1125 x 830 mm		1143 x 1320 x 1879 mm		
445 kg	480 kg	565 kg	600 kg	635 kg
1 inch hose barb (x2)				
IP54 (NEMA13 equivalent)**				



CS250 CS450



CS450 Fiber Laser



Typical CS450 laser output beam profile

CS250 - CS450 Mid Power Industrial Fiber Lasers

Convergent Photonics new CS Series Fiber Lasers, are designed to deliver the best beam quality and the highest performance in material processing to better suit the customer needs.

The highly efficient and compact CS Series medium power fiber lasers with output power up to 450W, guarantees low maintenance operation, high reliability and superior processing performances.

Capable for many different applications such as Precision Cutting and Additive Manufacturing which require that the fiber laser can output high beam quality with smallest beam spot size and proper power intensity.

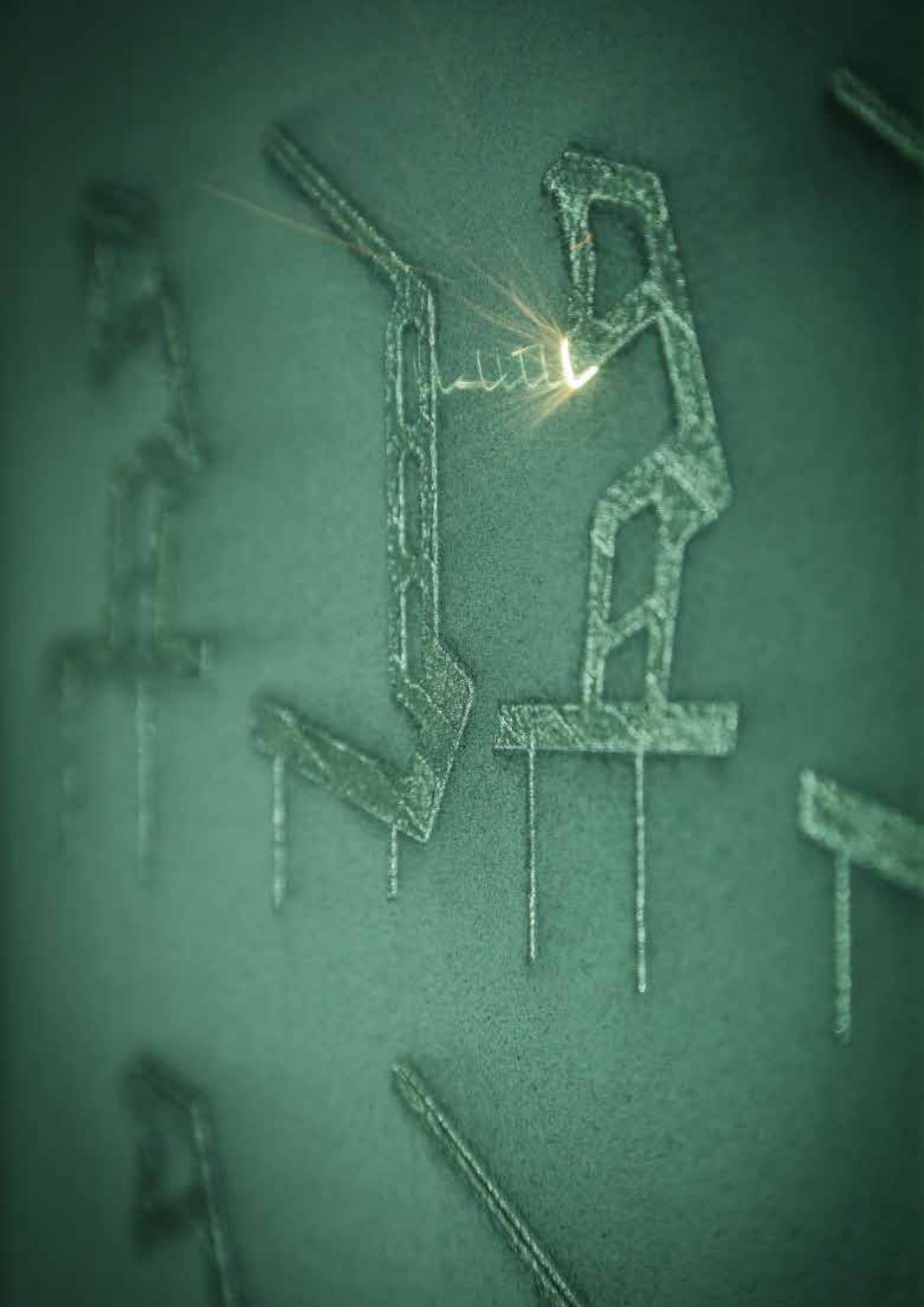
Main advantages in installing CS Series fiber lasers include:

- High Beam quality diffraction limited $M^2 \leq 1.1$
- Flexible laser beam delivery, 5m delivery fiber length, longer cable upon request
- High electro-optical efficiency, up to 30% wall-plug efficiency
- Simple, compact, maintenance free and robust design
- Laser Fiber delivery RQB, not water cooled, QBH optionally available
- Fast modulation
- Long term power stability, no beam wandering
- Optimized beam profile and Laser Spectrum for Scientific research

General Specifications

	CS250	CS450
Nominal Output Power	250W	450W
Power Range	25 W - 270 W	270 W - 490 W
Power Stability	Typ. $\pm 1\%$	
Pulsing Frequency	0 - 5 kHz	
Wavelength	1070 nm	
Polarization	Random	
Beam Parameter Product (1/e ²)	0.37 mm*mrad - 0.39 mm*mrad	
On/Off Time	1.2s	
Feeding fiber core diameter	12 μm	
Feeding fiber length	5 m	
Minimum bend radius	160 mm	
Output connector	RQB/QBH Fiber Optic Cable	
Safety	PLd	
Diode Pointing Laser	Wavelength 520 or 635 nm Power <1 mW	
Electrical Power Consumption	0.35 - 0.8 kW	0.7 - 1.6 kW EOL
Voltage	100 - 240 VAC, single-phase	
Operating Environment (min/max)	5° C / 50° C	
Relative Humidity	< 95% non-condensing	
Laser Cooling 35% Glycol Mix	Cooling Cap.	0.8 kW
	Pressure	6 Bar
	Flow	4 l/Min
	Temp	20° C \pm 2° C
Dimensions W / H / L	440/125/540 mm	
Weight	20 Kg	22 Kg
Connections	1/2 inch hose barb or 10mm OD quick disconnect fittings (x2)	
Ingress Protection Rating (IEC60529)	IP44*	

* It is recommended that the laser is mounted in an IP54 cabinet.



CT6000

CD6000

CT6000 - CD6000 High Power Twin & Diode Lasers

CT6000 Convergent Photonics laser is an innovative concept laser based on patented technology. It is equipped with two different process fibers, one with high power low brightness for welding/brazing (BPP = 66 mm*mrad), one at lower power higher brightness (BPP = 4 mm*mrad) for cutting/remote welding .

At the push of a button the laser can switch between one fiber and the other, allowing:

- maximum flexibility, as the same laser suits all possible applications
- wider application spectrum (cutting, laser welding, brazing, cladding)
- lower ownership cost
- optimal for low to medium production capacity, switching over different jobs

Switching from a configuration to the other does not require recalibration or adjustment, and require just a few seconds. The laser will supervise the fiber safety of both cables independently, and allows to use one process fiber while the other is disconnect or its working cell is accessed to change part.

Convergent Photonics laser CT6000 is equipped with n. 2 exit fibers: a 100 µm core feeding fiber on the fiber side, a 600 µm core feeding fiber on diode side.



CT6000 with integrated chiller.

Hybrid		
	Diode	Fiber
Feeding fiber length	20 m	
Minimum bend radius	200 mm	
Feeding fiber core diameter	600 µm	100 µm
Output connector	QD	QBH
Beam quality	66 mm*mrad	4 mm*mrad
Safety functions Performance Level(*)	PLc	

Building upon Convergent Photonics' years of experience in high power industrial lasers, the new CT Series lasers have incorporated cutting-edge back-reflection prevention techniques, suitably distributed through-out the laser. The coupled back-reflection is stripped through proprietary mode-stripping techniques, and safe dissipation of unwanted light, at critical points in the laser.

	CT6000	CD6000
Nominal Output Power	4000 - 6000 W	6000 W
Power Range (Fiber)	4000 - 4200 W	N/A
Power Range (Diode)	6000 - 6200 W	
Power Stability	Typ. \pm 1%	
Pulsing Frequency	0 - 5 kHz	
Wavelength	910 - 960 / 1070 - 1080 nm	910 - 960 nm
Polarization	Random	
Beam Parameter Product (1/e ²)	4 mm* mrad / 66 mm*mrad	66 mm*mrad
Feeding fiber core diameter	100 / 600 μ m	600 μ m
Feeding fiber length	20 m	
Minimum bend radius	200 mm	
Output connector	QBH / QD	QD
Electronic Shutter On/Off Time	200 ms	
Safety	PL e	
Diode Pointing Laser	Wavelength 635 / 658 nm Power < 1mW	
Electrical Power Consumption	27,6 kW	
Voltage	360 - 510 Vac 3P	
Operating Environment (min/max)	10 °C - 42 °C	
Relative Humidity	95% non - condensing	
Internal chiller cooling 35% Glycol Mix	Cooling Capacity	15 kW
	Pressure	6 bar
	Flow	35 l/min
	Temperature	15 °C - 27 °C
Process Fiber Cooling DI water	Cooling Capacity	1 kW
	Pressure	6 bar
	Flow	35 l/min
	Temperature	25 °C \pm 3 °C
Dimensions W / H / L	1050 x 2100/1300(w/o chiller) x 1050 mm	
Weight	950/650 (w/o chiller) kg	
External coolant connections	1 inch hose barb (x2)	
Protection Degree (IEC60529)	IP54 (NEMA13 equivalent)	



CM4000 CM4500 CM5000

CM Series

Convergent Photonics provides the highest performing, highly efficient and very reliable CO₂ Lasers for manufacturing, with DC discharge. CM Series Lasers, with optimum beam quality for laser processing, excel in cutting and welding broad range of materials and thicknesses, and are equipped with most recent technological advancement available to the fast flow CO₂ lasers.

CM Series features include:

- New turbine equipped with Magnetic Bearing rotating mechanism
- Smart gas feed system to minimize laser gas consumption. Total gas consumption as low as 5-15 l/hour
- New Solid State high voltage power supply with hi-tech resin, Oil Free Transformer (no more oil submerged components)



CM Series laser turbine with magnetic bearing saves maintenance cost.



CM4000 CO₂ Laser

CX2500 CX3000

CX Series

Convergent Photonics CX Series Lasers, designed with operational efficiency in mind for laser processing, are considered as the best economical fit for cutting and welding broad range of materials and thickness in 2D and 3D. Technologies used have been refined over years of development to ensure most economical solution to the users without sacrificing performance and reliability. All models are based on proprietary resonator technology, which allows high stability of the beam, thanks to carbon fiber structure and stress-free design.

CX Lasers main features are:

- High Reliability
- High Operational Efficiency
- Small Footprint



CX3000 CO₂ Laser

Max Cutting Capability (thickness value in mm)

	CM4000/4500	CM5000	CX2500	CX3000
Mild Steel	25	25	15	20
Stainless Steel	15	20	8	10
Aluminum	12	12	5	8
Copper	-	-	-	-
Brass	-	-	-	-

CO₂ Lasers - Technical specifications

	CX2500	CX3000	CM4000	CM4500	CM5000
Average Power	200 - 2500 W	200 - 3000 W	200 - 4000 W	200 - 4500 W	200 - 5000 W
Wavelength	10.6 µm				
Beam Propagation Factor M2 typical (Prometec)	2.1 - 2.5		2.0 - 2.4		2.2 - 2.6
Beam Divergence	1.5 mrad half angle				
Beam Diameter at Output	14.5 mm @ 1/e2, 19 mm full beam				
Pulsing					
Pulse Rep. Rate	0-2 kHz				
Pulse Width	>100 µseconds				
Pointing Stability	+/-150 µrad				
Diode Pointing Laser	Wavelength 635 nm Power <1 mW				
Electrical Power Consumption	29kW	32 kW	34 kW	36 kW	40 kW
Voltage	400/600Vac 3P				
Operating Environment (min/max)	10°C / 40°C (50°F / 104°F)				
Relative Humidity	<95% non-condensing				
Cooling					
Required capacity	27 kW	29 kW	30 kW	33 kW	36 kW
Inlet temperature	18°C / 20°C (64,4°F / 68°F)				
Pressure	4 bar - 5 bar		3 bar - 7 bar		
Flow	133 l/min				
Fluid	Distill Water / 35% Glycol				
Filter requirement	500 µm				
Gas Consumption - He (68%), N2 (36%), CO ₂ (4%)	5 - 15 l/hour				20 - 70 l/hour
Dimensions W x H x L	850 x 887 x 2551 mm		884 x 960 x 3156 mm		849,6 x 957 x 3119 mm
Weight	1137 Kg		1200 Kg		1200 Kg
Protection Degree (IEC60529)	IP54 (NEMA 13 equivalent)				





CP4000 CO₂ Laser retrofitted with new magnetic bearing turbine to improve performance and lower the cost of maintenance.

Retrofit Your Convergent Product

Are you considering upgrading or retrofitting your **Convergent Photonics** lasers? We may be able to provide you with upgrade/retrofit kit and service which will surely provide you with good return on investment.

Convergent Laser Service

Convergent Photonics with expert laser engineers can support your equipment needs on site, over the telephone, or by e-mail.

Convergent Spare Parts

Convergent Photonics manufacturing facility holds extensive number of spare parts for current and legacy lasers to support production demand of laser users around the world.

Global Coverage

Convergent Photonics products are globally supported 24/7.



Get in contact with Convergent Photonics worldwide:

USA

t. +1 413 598 5200

service.convergent.usa@primaelectro.com

ASIA

t. +86 020 875 18211

service.convergent.china@primaelectro.com

EUROPE

t. +39 011 9899 801

service.convergent.europa@primaelectro.com

History of Convergent Photonics

The history of Convergent Photonics dates back in 1961, shortly after the invention of the laser in 1960. The CO₂ product line of Convergent can be traced to 1966, with the start-up of Coherent Radiation (Palo Alto, CA). Coherent founders demonstrated their first CO₂ laser at the Westcon exhibition in the fall of 1966. The first customer for the laser was the Boeing Co. where it was used “to investigate cutting and welding titanium”.

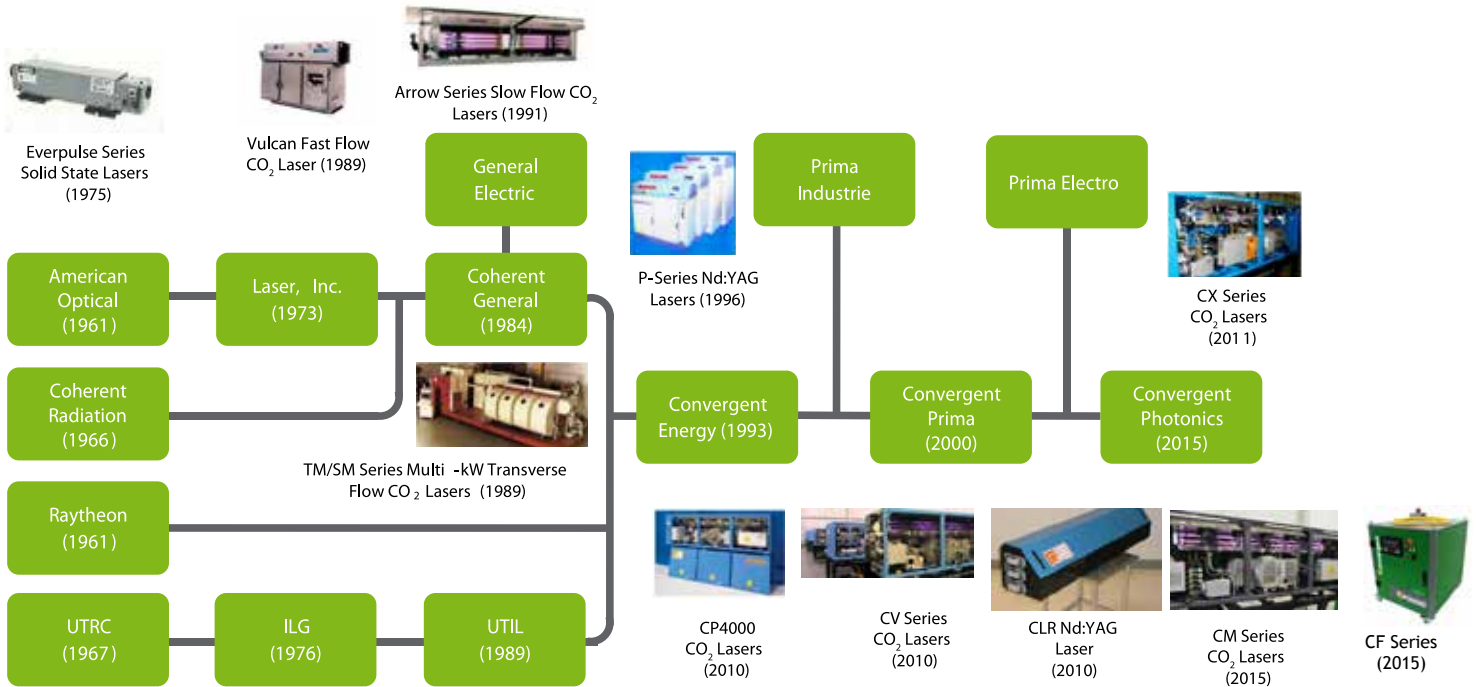
In 1981, Laser Inc. began to purchase and assemble kits for CO₂ lasers from Coherent and shortly thereafter, Coherent acquired Laser Inc., which became the industrial arm of Coherent, producing several models of slow flow CO₂ lasers. Coherent General was formed in 1984 when General Electric made an investment in the company with the goal of obtaining a next generation Nd:YAG drilling laser. This business, which was now producing both CO₂ and Nd:YAG industrial lasers, was sold to Transtec in 1993, but, as part of the acquisition, Transtec was required to change the name no longer using ‘Coherent’.

The name Convergent Energy was then given to the laser business. During this same time, Transtec also acquired the rights for manufacturing and service of the Raytheon solid state laser products which had first appeared in the market also in the early 1960’s. Meanwhile, UTRC (United Technology Research Center) which was formed in 1967, had started developing high power CO₂ lasers (6 to 45 kW). The company that came out of the development was originally called the Industrial Laser Group (ILG) and, in 1989, was renamed United Technologies Industrial Lasers, or UTIL, headquartered in East Hartford, CT. This business was taken over by Transtec in 1994 when UTRC decided that it no longer wanted to pursue the industrial laser business, at which point Convergent Energy was renamed Convergent Lasers.

In 2000, Convergent Lasers was acquired from Prima Industrie Group, becoming part of Prima Electro Division in 2011, under the brand name of Convergent. In 2014 was announced that Convergent changed its name to Convergent Photonics, a strategic branding choice to communicate its new dynamic outlook and further underscoring the company’s drive to offer high reliability, innovative solutions to the market place. With this new identity, Convergent Photonics presents itself as a global supplier of photonics technologies and a myriad of high power industrial laser sources for materials processing. This transition heralds a new beginning for Convergent Photonics as it becomes a reliable international partner and provider to all leading OEMs, offering unparalleled customer satisfaction, worldwide.



Proud to be part of Laser History from the beginning



convergent



USA
711 East Main Street - Chicopee
Chicopee, MA - USA
Phone: +1 413 598 5200
Fax: +1 413 598 5201



EUROPE
Via Torino, 14
10010 Barone Canavese (TO) - ITALY
Phone: +39 011 9899 800
Fax: +39 011 9899 808



Via Schiaparelli, 12
10148 Torino - ITALY
Phone: +39 011 0690 606
Fax: +39 011 9899 804

ASIA
459, Xingrui Road, Eco-Tech Development Zone,
Wujiang District, Suzhou City - PRC
Phone: +86 020 87518211
Fax: +86 020 87518211

contacts@convergent-photonics.com
convergent-photonics.com

