



sealed CO₂ lasers

In 1984, Synrad introduced the world's first RF-excited, sealed CO₂ laser – the model 48-1, 10W laser, and our patented “all-metal” tube construction opened new doors for CO₂ lasers. The 48-series included 10, 25 and 50W models, to be followed, in 1991, by our higher power, 100-240W *evolution series*.

The low cost, long operating lifetimes, and nearly maintenance-free operation of these lasers, combined with their compact size and rugged construction, made them ideal for many industrial applications.

In 2001, to better address the needs of demanding new applications, we developed our *firestar series*. Although they share a common name, the *v-series* (30-40W), *t-series* (60-100W), and *f-series* (100-400W) represent three distinct laser technologies, each designed to offer specific benefits to our customers.

Today, with over 100,000 Synrad lasers in use worldwide, we are committed to the ongoing development of both existing and new laser technologies. By providing a range of technologies, we can supply CO₂ lasers that precisely match the requirements of specific applications, ensuring the optimum performance of each system.





- 10, 25 & 50W
- Rugged, reliable, low cost design
- Long operating lifetimes
- Air- or water-cooled models

www.synrad.com/48series

Synrad's original "all-metal" tube technology opened the door for sealed CO₂ lasers in many industrial applications. After 20 years, our 48-series remains the industry standard for performance, reliability, long lifetime, and low cost.

Specifications

Model	48-1	48-1W	48-2	48-2W	48-5W
Output Power	10W		25W		50W
Mode Quality	$M^2 \leq 1.2$		$M^2 \leq 1.2$		$M^2 \leq 1.2$
Ellipticity	<1.2		<1.2		<1.2
Rise Time	<150µsec		<150µsec		<150µsec
Beam Diameter	3.5mm		3.5mm		3.5mm
Beam Divergence (full angle)	4mR		4mR		4mR
Wavelength	10.57-10.63µm*		10.57-10.63µm*		10.57-10.63µm*
Power Stability, from cold start (guaranteed)	±10%		±5%		±5%
Polarization	Linear (Vertical)		Linear (Vertical)		Random
Cooling	Air	Water	Air	Water	Water
Heat Load (max)	300W		500W		800W
Flow Rate, Air	250 CFM x 2	N/A	250 CFM x 4	N/A	N/A
Flow Rate, Water (18-22°C)	N/A	0.5 GPM	N/A	0.8 GPM	1.5 GPM
Input Voltage / Current	30 VDC / 7A		30 VDC / 14A		30 VDC / 28A
Dimensions (in)	16.9 x 2.8 x 4.2		31.9 x 2.8 x 4.2		34.9 x 5.3 x 4.5
(mm)	429 x 71 x 107		810 x 71 x 107		886 x 135 x 114
Weight	9 lbs / 4.1 kg		18 lbs / 8.2 kg		44 lbs / 20 kg

*Typical. Actual wavelength range may vary from 10.2 to 10.8µm. Beam specifications measured at 1/e².

Specifications

Model	Evo 100	Evo 125	Evo 200	Evo 240
Output Power	100W	125W	200W	240W
Mode Quality	$M^2 \leq 1.2$	$M^2 \leq 1.2$	$M^2 \leq 1.2$	$M^2 \leq 1.2$
Ellipticity	<1.2	<1.2	<1.2	<1.2
Rise Time	<150 μ sec	<150 μ sec	<150 μ sec	<150 μ sec
Beam Diameter	4mm	4.4mm	4mm	4.4mm
Beam Divergence (full angle)	3.5mR	3.2mR	3.5mR	3.2mR
Wavelength	10.59 μ m	10.59 μ m	10.59 μ m	10.59 μ m
Power Stability, from cold start (guaranteed)	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$
Polarization	Linear (Vertical)	Linear (Vertical)	Random	Random
Cooling	Water	Water	Water	Water
Heat Load (max)	2000W	3000W	4000W	6000W
Flow Rate (18-22°C)	2.0 GPM, <70 PSI	2.0 GPM, <70 PSI	4.0 GPM, <70 PSI	4.0 GPM, <70 PSI
Input Voltage / Current	30 VDC / 80A	30 VDC / 95A	30 VDC / 160A	30 VDC / 190A
Dimensions, Laser Head (in)	41.8 x 6.6 x 4.8	48.8 x 6.6 x 4.8	45.6 x 6.9 x 10.8	52.6 x 6.9 x 10.8
(mm)	1062 x 168 x 122	1240 x 168 x 122	1158 x 175 x 274	1336 x 175 x 274
Dimensions, RF Supply** (in)	12.0 x 19.0 x 8.9	12.0 x 19.0 x 8.9	12.0 x 19.0 x 8.9 (x2)	12.0 x 19.0 x 8.9 (x2)
(mm)	305 x 483 x 226	305 x 483 x 226	305 x 483 x 226 (x2)	305 x 483 x 226 (x2)
Weight, Laser Head	30 lbs / 13.6 kg	36 lbs / 16.3 kg	70 lbs / 31.8 kg	84 lbs / 38.1
Weight, RF Supply**	32 lbs / 14.6 kg	32 lbs / 14.6 kg	32 lbs / 14.6 kg x 2	32 lbs / 14.6 kg x 2

**Evolution series lasers operate from an external RF power supply.
Beam specifications measured at 1/e².

- 100, 125, 200, & 240W
- Excellent wavelength and power stability
- Rugged, robust design
- OEM and keyswitch models available

www.synrad.com/evolution



Extending our “all metal” technology by using a folded resonator design, the *evolution series* provides output powers from 100 to 240W. The long cavity lengths of these lasers provide excellent power and wavelength stability, critical to many applications.



- 30 & 40W
- Shortest laser package
- Excellent near-field beam quality
- Fast rise/fall time

www.synrad.com/vseries

The short length of the *firestar v-series*, especially relative to our *48-series*, makes them ideal for integration into desktop engravers and compact marking & coding systems. The *v30* (30W) has been designed specifically for these OEMs.

Specifications

Model	v30	v40	v40W
Output Power	30W	40W	
Mode Quality	$M^2 \leq 1.2$	$M^2 \leq 1.2$	
Ellipticity	<1.2	<1.2	
Rise Time	<100µsec	<100µsec	
Beam Diameter	2.5±0.5mm	2.5±0.5mm	
Beam Divergence (full angle)	<7.0mR	<7.0mR	
Wavelength	10.57-10.63µm*	10.57-10.63µm*	
Power Stability, from cold start (guaranteed) after 2 minutes (typical)	±5% ±3%	±5% ±3%	
Polarization	Linear (Horizontal)	Linear (Horizontal)	
Cooling	Air	Air	Water
Heat Load (max)	550W	700W	
Flow Rate, Air	140 CFM x 2	140 CFM x 2	N/A
Flow Rate, Water (18-22°C)	N/A	N/A	1.0 GPM, <60 PSI
Input Voltage / Current	30 VDC / 18A	30 VDC / 24A	
Dimensions (in)	16.8 x 4.6 x 5.8	22.8 x 4.6 x 5.8	
(mm)	428 x 117 x 146	579 x 117 x 146	
Weight	18 lbs / 8.2 kg	23 lbs / 10.4 kg	24 lbs / 10.9 kg

*Typical. Actual wavelength range may vary from 10.2 to 10.8µm.
Beam specifications measured at 1/e².



- 100, 200 & 400W
- Integrated RF power supply
- Excellent beam quality
- Rugged, 3-point mounting system

www.synrad.com/fseries

Synrad's firestar f-series CO₂ lasers are designed to provide cost-effective output power from 100-400W. The fully integrated laser/RF design is perfect for mounting on robotic arms, or integrating into flatbed cutting systems and high-speed marking systems.

Specifications

Model	f100	f200	f201	f400
Output Power	100W	200W	200W	400W
Mode Quality	M ² <1.2±0.1	M ² <1.2±0.1	M ² <1.2±0.1	M ² <1.2±0.1
Ellipticity	<1.2	<1.2	<1.2	<1.2
Rise Time	<150µsec	<150µsec	<150µsec	<150µsec
Beam Diameter	3.5mm	3.5mm	4.5mm	4.5mm
Beam Divergence (full angle)	4.0mR	4.0mR	4.0mR	4.0mR
Wavelength	10.2-10.7µm	10.2-10.7µm	10.2-10.7µm	10.2-10.7µm
Power Stability, from cold start (guaranteed) after 2 minutes (typical)	±10% ±6%	±10% ±6%	±7% ±5%	±7% ±5%
Polarization	Linear (Horizontal)	Random	Linear (Horizontal)	Random
Cooling	Water	Water	Water	Water
Heat Load (max)	2000W	4000W	4000W	8000W
Flow Rate, Water (18-22°C) (min.)	2.0 GPM, <60 PSI	4.0 GPM, <60 PSI	2.0 GPM, <60 PSI	4.0 GPM, <60 PSI
Input Voltage / Current	96 VDC / 18A	96 VDC / 36A	96 VDC / 36A	96 VDC / 72A
Dimensions (in)	25.1 x 6.3 x 5.6	28.8 x 12.4 x 7.2	45.9 x 8.6 x 6.5	51.0 x 15.2 x 7.3
(mm)	638 x 160 x 142	732 x 315 x 183	1166 x 218 x 165	1295 x 386 x 185
Weight	38 lbs / 17.2 kg	80 lbs / 36.3 kg	96 lbs / 43.5 kg	170 lbs / 77.1 kg

Beam specifications measured at 1/e².

Specifications

Model	t60		t60W		t70i		t70iW	
Output Power	60W				70W			
Mode Quality	$M^2 \leq 1.2$				$M^2 \leq 1.2$			
Ellipticity	<1.2				<1.2			
Rise Time	<75 μ sec				<75 μ sec			
Beam Diameter	2.2 \pm 0.2mm				2.2 \pm 0.2mm			
Beam Divergence (full angle)	7.0mR				7.0mR			
Wavelength	10.57-10.63 μ m				10.57-10.63 μ m			
Power Stability, from cold start (guaranteed)	\pm 7%				\pm 7%			
Polarization	Linear (Vertical)				Linear (Vertical)			
Cooling	Air		Water		Air		Water	
Heat Load (max)	1400W				1400W			
Flow Rate, Air	130 CFM x 2		N/A		195 CFM x 2		N/A	
Flow Rate, Water (18-22°C)	N/A		0.75-2 GPM, <60 PSI		N/A		1.5 GPM, <60 PSI	
Input Voltage / Current	30 VDC / 45A				48 VDC / 25A			
Dimensions, Laser Head (in)	20.8 x 4.6 x 5.9		21.4 x 4.1 x 5.9		20.7 x 4.5 x 6.7		22.4 x 4.7 x 6.1	
(mm)	528 x 117 x 150		544 x 104 x 150		527 x 114 x 170		570 x 120 x 154	
Dimensions, RF Power Supply** (in)	12.2 x 12.5 x 6.1		12.0 x 12.5 x 3.5		N/A		N/A	
(mm)	309 x 317 x 156		305 x 317 x 89		N/A		N/A	
Weight, Laser Head	22 lbs / 10 kg		24 lbs / 10.9 kg		30 lbs / 13.6 kg		30 lbs / 13.6 kg	
Weight, RF Power Supply**	19 lbs / 8.7 kg		17 lbs / 7.7 kg		N/A		N/A	

**All firestar t-series lasers, except the t70i, operate from an external RF power supply. The firestar t70i includes an internal RF supply. Beam specifications measured at 1/e².

Ideal for high-speed marking and engraving systems, our *firestar t-series* offers the benefits of air- or water-cooled operation at power levels of 60, 70, 80, and 100W. The t70i incorporates an efficient RF power supply in a single, compact package.



- 60, 70, 80 & 100W
- Compact, air- or water-cooled design
- Fast rise/fall time
- Common beam exits w/ *firestar v-series*

www.synrad.com/tseries

Specifications

Model	t80		t100	
Output Power	80W		100W	
Mode Quality	$M^2 \leq 1.2$		$M^2 \leq 1.2$	
Ellipticity	<1.2		<1.2	
Rise Time	<75 μ sec		<75 μ sec	
Beam Diameter	2.2 \pm 0.2mm		2.2 \pm 0.2mm	
Beam Divergence (full angle)	7.0mR		7.0mR	
Wavelength	10.57-10.63 μ m		10.57-10.63 μ m	
Power Stability, from cold start (guaranteed)	\pm 7%		\pm 7%	
Polarization	Linear (Vertical)		Linear (Vertical)	
Cooling	Air	Water	Air	Water
Heat Load (max)	2000W		2300W	
Flow Rate, Air	195 CFM x 2	N/A	195 CFM x 2	N/A
Flow Rate, Water (18-22°C)	N/A	0.75-2 GPM, <60 PSI	N/A	0.75-2 GPM, <60 PSI
Input Voltage / Current	36 VDC / 55A		30 VDC / 75A	
Dimensions, Laser Head (in)	20.8 x 4.6 x 5.9	21.4 x 4.1 x 5.9	20.8 x 4.6 x 5.9	21.4 x 4.1 x 5.9
(mm)	528 x 117 x 150	544 x 104 x 150	528 x 117 x 150	544 x 104 x 150
Dimensions, RF Power Supply** (in)	12.2 x 12.5 x 6.1	12.0 x 12.5 x 3.5	17.5 x 14.1 x 6.8	17.5 x 14.1 x 4.5
(mm)	309 x 317 x 156	305 x 317 x 89	445 x 358 x 173	445 x 358 x 114
Weight, Laser Head	22 lbs / 10 kg	24 lbs / 10.9 kg	22 lbs / 10 kg	24 lbs / 10.9 kg
Weight, RF Power Supply**	19 lbs / 8.7 kg	17 lbs / 7.7 kg	30 lbs / 13.6 kg	34 lbs / 15.4 kg

**All firestar t-series lasers, except the t70i, operate from an external RF power supply. The firestar t70i includes an internal RF supply. Beam specifications measured at 1/e².



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All specifications in this document are subject to change without notice.

