



# Ultra and CFR



## Spectral and General Information

### Linewidth

Wavelength	1064nm	532nm	355nm	266nm	1,57µm
Linewidth (cm <sup>-1</sup> ) [11]	<1	<2	<3	<4	<12

### Polarization

	Wave length (nm)	Ultra	CFR 200/400	CFR 800	Spectral Purity (All Models; %) [12]	
					Dual	Quad
	1064	H	H	H		
Polarization (E Vector with Respect to Laser Head)	532	V	V	V	>97	>99.5
	355 [13]	H	V	V	>90	>99.5
	266	H	V	V	>85	>99
	1,57µm	H	V	V		

### Dimensions, mm (inches)

System Laser Heads HxWxL	Weight kg	Power Supply HxWxD	Weight kg	System Modules
Ultra	51 x 76 x 203 (2 x 3 x 8)	0,9	Ultra ICE	386 x 190 x 371 (15.2 x 7.5 x 14.6) 13,9
CFR 200 / 400	84 x 94 x 323 (3.3 x 3.7 x 12.7)	3,6	Standard ICE	585 x 286 x 592 (23 x 11.3 x 23.3) 43
CFR 800	146 x 165 x 366 (5.75 x 6.5 x 14.4)	11,3	Mini-ICE	216 x 287 x 457 (8.5 x 11.3 x 18) 20,4
				Ultra Harmonics L = 91 (3.6)
				Ultra Dichroic L = 45 (1.8)
				Ultra FOLA L = 76 (3)
				Ultra OPO L = 95 (3.8)
				CFR 200/400 Dichroic L = 41 (1.6)
				CFR OPO Module L = 155 (6.1)

Specification notes [11] Line narrowing etalons available for certain models. [12] Dual dichroic is standard, optional separation package option. Quad is optional high purity package available on CFR 200 / 400. [13] HE option rotates the polarization 90°.

Important note: Specified energy will be delivered at the selected primary wavelength only. The specification will correspond to the selected primary wavelength, model, resonator configuration and repetition frequency. Energy at the residual wavelengths will be lower than values given overleaf. Any additional specifications given on the quotation will supersede those given here.

### Wavelength Separation Options

Ultra	WS	Separated with Residual Dumped Internally
	WSS	Separated with Residual from Second Aperture
CFR	WS1	Separated with Residual Dumped Internally
	WS2	Separated with Residual from Second Aperture
	WSS	Separated with Switchable Beam Block
	WS3	Separated with Three Output Apertures
	WSP	High Purity Option

STD Cable Lengths:	Ultra Models	1.8m (6 feet)
	CFR Models	3.0m (10 feet)
	Other lengths available upon request	

Electrical Requirements: 110 - 240VAC, 50 or 60Hz, single phase. Voltage must be specified



# Ultra and CFR Specifications



	Wave length (nm)	ULTRA				CFR200								CFR400					CFR800		
		Stable		TEM00	GRM	Stable			TEM00	GRM		Stable			GRM		Stable	GRM			
Repetition Frequency (Hz)		To 20	To 50	To 20	To 20	To 30	50	100	100	To 20	30	50	100	10	20	30	To 20	30	10	10	To 20
Pulse Energy (mJ)	1064	50	20	10	50	200	125	30	10	200	180	100	25	400	400	330	330	330	800	800	800
	532	30	12	6	30	130	70	15	6	115	100	60	15	230	230	190	200	170	400	400	400
	355	5,5	1,5	2	7	25		2	2	40	35	20	5				60	50	100	135	125
	355HE	16	2,5	2,5	16	50	15	6	2,5					90	90	80			300		
	266	4	2,5	1					1	20	15	10	3				40	30	80	85	80
	1,57 $\mu$ m*	8	1,5			35	10							70	65	65			150	135	135
Pulse Duration (ns) [1]	1064	8	11	8	8	12	15	12	13	9	9	16	14	10	10	10	9	9	10	9	9
	532	7	10	7	7	11	14	11	12	8	8	12	<9	9	9	9	8	8	10	9	9
	355	6	9	6	6				11	9	7	10	8				7	7	10	9	9
	355HE	7	10	7	7	8	9	8	11					7	7	7			10	9	9
	266	6	10	6					11	9	7	10	8				8	7	10	9	9
	1,57 $\mu$ m*	8	11			12				9	9	9		9	9	9			10	9	9
Beam Divergence (mrad) [2]	1064	<7	<6	<1.5	<1.5	<4	<4	<3	<1.5	<1.5	<1.5	<1.5	<1.5	<4.5	<4.5	<5	<1.5	<1.5	<4	<1.5	<1.5
	532	<6	<5	<1.5	<1.5	<4	<3.5	<3	<1.5	<1.5	<1.5	<1.5	<1.5	<3.5	<3.5	<4.5	<1.5	<1.5	<4	<1.2	<1.2
	355	<3	<5	<1	<1				<1	<1	<1	<1	<1				<1.8	<1.8	<4	<1	<1
	355HE	<5	<4	<1	<1	<3	<3	<2.5	<1					<3.5	<3.5	<4			<4		
	266	<7	<4	<1					<1	<1	<1	<1	<1				<1.2	<1.2	<4	<1	<1
	1,57 $\mu$ m*	<12	<10			<12								<12	<12	<12			<15	<15	<15
Energy Stability (%) [3]	1064	<2	<2.5	<3	<4	<2	<3	<4	<3	<2	<2	<3	<3	<2	<2	<2	<2	<2	<1	<1	<1
	532	<2.5	<4	<3.5	<5	<2.5	<4	<5	<4	<2.5	<2.5	<4	<4	<2.5	<2.5	<2.5	<2.5	<2.5	<2	<2	<2
	355	<3	<4	<4	<6				<5	<3	<3	<5	<5				<5	<5	<2	<4	<4
	355HE	<3	<4	<4	<6	<3	<4	<5	<5					<2	<2	<2			<2		
	266	<3	<4	<5					<5	<3	<3	<5	<5				<5	<5	<2	<4	<4
	1,57 $\mu$ m*	<2	<7.5			<5								<5	<5	<5			<5	<5	<5
Beam Diameter (mm) [4]	All	2,8	2,2	1,5	2,8	6	6	2,8	1,5	6	6	6	2,8	7			7		12		
Pointing Stability ( $\mu$ rad) [5]	All	50	50	50	100	100			100		100			100			100		100		100
Jitter, (+/-ns WRT Q-switch) [6]	All			<2					<1					<1			<1		<2		<2
Q-Switch Delay (s) [7]	All			N/A					2					2			2		5		5
Energy Ramp-Up (Q-switch pulses) [8]	All			N/A		20	50	100	100	20	30	50	100	10	20	30	20	30	N/A		N/A

Specifications applying to all 1064nm systems

Energy Drift over 8 hour Period <10%  
 Operating Temperature 10 / 40 °C [10]  
 Flashlamp Lifetime >20 million Shots  
 Storage Temperature 5 / 70 °C  
 Maximum Altitude 10 000 feet / 3 000 m

Ethylene Glycol Option [9]

Operating Temperature -10 / 40 °C  
 Storage Temperature -30 / 70 °C

\*Nominal values, other wavelengths available upon request

**Specification Notes**  
 [1] Nominal FWHM, +/-2ns  
 [3] Variation from mean for 99% of shots  
 [5] Full angle, 99% of shots  
 [7] Disables Q-Switch until after resonator has stabilized  
 [9] 10% Energy drop. Not available with Ultra models. Values for laser head only  
 [2] Angle containing 86.5% energy. Other methods can predict lower values for GRM Systems  
 [4] Nominal value  
 [6] Measured from Q-Switch Sync. output  
 [8] Energy builds up after enabling Q-Switch over a number of Q-Switch trigger pulses. This feature may be changed or disabled  
 [10] Derate for certain operation conditions. Energy may vary within this temperature range

Note on Beam Divergence: Big Sky Laser pioneered beam measurement software and measures divergence as angle containing energy. For GRM systems, this returns a figure which can be considerably larger than that given using alternative criteria. The intrinsic or irreducible divergence is less than 0.5mrad for the CFR GRM series.