CARMEL

X-1550

1550 nm High Power Femtosecond Fiber Laser

Applications

- Multiphoton microscopy
- Optical metrology
- Two photon integrated circuit testing
- Materials characterization
- Terahertz radiation
- Nonlinear spectroscopy
- Micro-machining and materials processing
- Seeding high output lasers

Features

- High power stability
- < 100 fs pulse widths
- Outstanding beam quality (M^2 < 1.1)
- Exceptional beam pointing stability
- Optional 780 nm output
- All air-cooled, no chiller required
- Remote system diagnostics
- Expected lifetime > 10,000 hours

The Carmel X-series is a range of high power, air-cooled, fiber-based femtosecond lasers with output powers from 0.2 to greater than 2.5 W and pulse widths of less than 100 fs in the industry's most compact, user-friendly package. The Carmel X-1550 provides the perfect 1550 nm source for a wide range of ultrafast laser applications, including multiphoton microscopy, optical metrology, two photon integrated circuit testing and micro-machining. It is offered as both a scientific version with front panel controls and an OEM version controlled through an RS-232 interface. The Carmel X-1550 can be configured for dual wavelength output to enable alternating access to 1550 and 780 nm outputs (see the Carmel X-780/1550 data sheet for details).

The system features a rack mountable controller with a robust armored cable interface to the compact laser head, which facilitates its incorporation into OEM designs. A simple key switch interface provides for manual operation with full remote access through computer control. The X-series includes the capability of remote data logging, power monitoring, system diagnostics, and automated adjustments for prolonged lifetime and OEM preventative maintenance. The rugged design supports 24/7 operation with an expected lifetime of > 10,000 hours.

The building block of the X-series is Calmar's renowned ultrafast fiber seed laser platform, which utilizes the proprietary Mendocino saturable absorber technology developed and perfected over a twenty year period to deliver reproducible and reliable mode-locking at turn-on. The system provides an output pulse width of < 100 fs with minimal pulse pedestal and excellent long term pulse-to-pulse stability (<1% rms) over a wide operating temperature range (17-38°C). An exceptional output beam quality (M^2 < 1.1) enables a near diffraction-limited spot size with suitable microscope objectives for demanding multiphoton and materials processing applications. Repetition rates can be specified from 10 to 80 MHz with an RF synchronization output provided as a trigger signal.

For multiphoton microscopy applications, the Carmel X-1550 provides an ideal ultrafast laser solution for optimum multiphoton fluorescence and third harmonic cellular tissue imaging with minimal scatter and reduced risk of photodamage. The compact laser head and associated armored fiber cable make for straight forward integration into existing microscopes with minimal delivery optics.

If the performance parameters do not quite fit your application requirements, please contact us at sales@calmarlaser.com to discuss a customized solution

Technical Specifications[1]

Model Number[2]	CFL-ZCFF
OPTICAL	
Central Wavelength (nm)	~ 1550
Pulse Width[3] (fs)	< 100
Average Power (W)	> 2.5
Repitition Rate[4] (MHz)	10 - 80
Pulse Energy[5] (nJ)	Up to 50
Spectrum Width (FWHM, nm)	> 30
Power Stability over 8 hours[6] (%, RMS)	< 0.3
Beam Quality, M^2	< 1.1
Beam Diameter at Exit (typical, mm)	1.2 (beam roundness > 90%)
Polarization Extinction Ratio (dB)	> 20
Output/Termination	Free space, collimated beam
ELECTRICAL	
Electrical Synchronization (V)	~ 0.5, SMA connector
Supply Voltage	85 - 264 VAC at 47 – 63 Hz, autoranging
Power consumption (W)	< 120
MECHANICAL	
Operating Temperature (°C)	17 - 38
Storage Temperature (°C)	0 - 50
Connection between Controller and Head[7]	1 m fixed armored cable
Laser Head Dimensions (cm)	9.0(W) x 18(D) x 3.5(H)
Laser Controller Dimensions (cm)	48.2(W) x 46.7(D) x 10(H); 19 inch 2U
Laser Head Weight (kg)	0.8 (typical)
Laser Controller Weight (kg)	13.6 (typical)
Cooling	Controller air-cooled by low noise fan
Warm-up Time (min)	< 10
I/O CONTROL	
Communication Interface[8]	RS-232 Serial Port, Monitor Port
Front Panel Control Interface	Power Switch, Laser Key Switch, Emergency Stop Button

1. Due to our continuous improvement philosophy, all product specifications are subject to change without prior notice. Please contact sales@calmarlaser.com for customized specifications.
2. Z depends on the output power: Z = 04 (> 0.25W), 05 (> 0.5 W), 10 (> 1 W), 20 (> 2.0 W), or 25 (> 2.5W). Power needs to be specified at the time of purchase.
3. A $sech^2$ pulse shape (deconvolution factor of 0.65) is used to determine the pulse width from the second harmonic autocorrelation trace.
4. The repetition rate needs to be specified at the time of purchase. For other repetition rates, please contact sales@calmarlaser.com.
5. The absolute pulse energy will depend on the version and specified repetition rate.
6. Requires an ambient temperature control of ± 1.0ºC and appropriate mounting for the laser head.
7. For other cable length options, please contact sales@calmarlaser.com.
8. Standard on the OEM version, for the scientific version please contact sales@calmarlaser.com.

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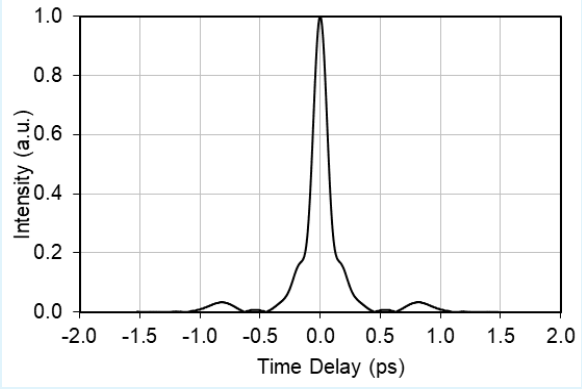
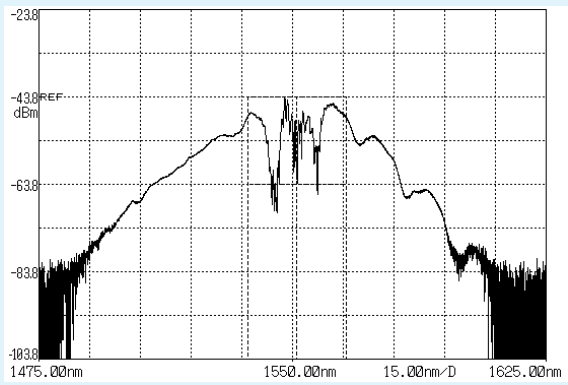
1550 nm High Power Fiber Based Femtosecond Laser

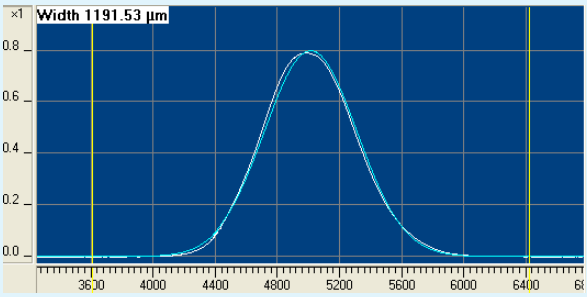
Optical Characterization



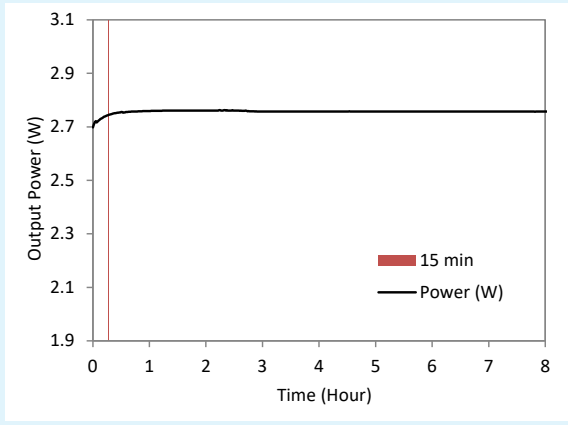
Typical Autocorrelation Trace



Typical Optical Spectrum



Typical Beam Profile



Typical Power Stability

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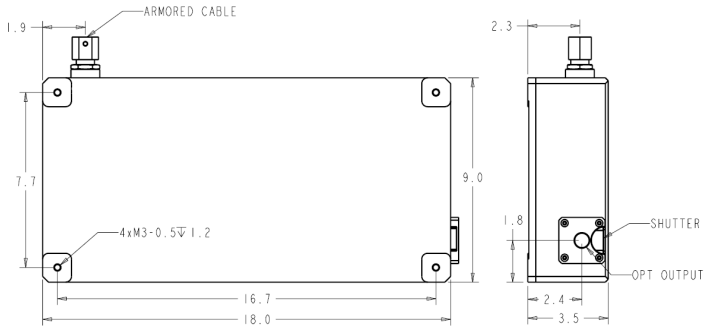
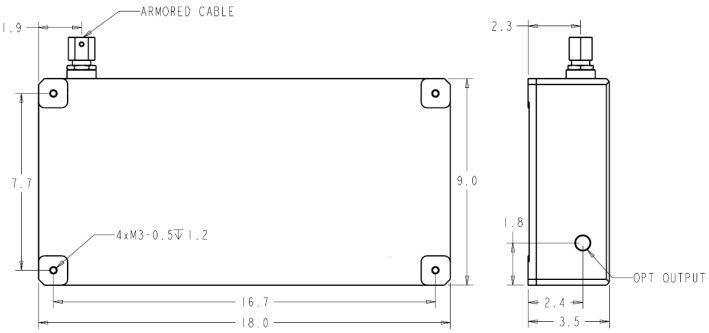
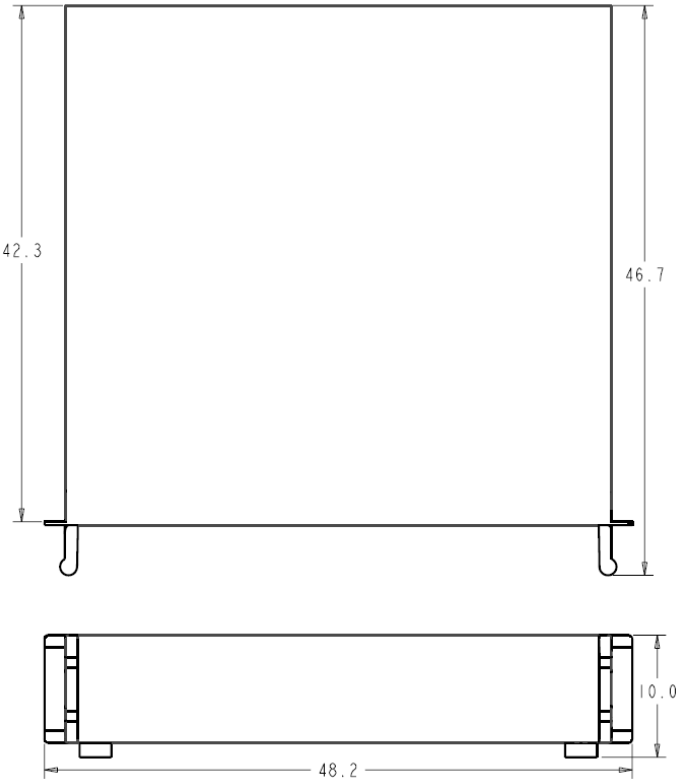
Mechanical Dimensions



Dimensions of Laser Head for Scientific Model (cm)



Dimensions of Laser Head for OEM Model (cm)



Dimensions of Laser Controller (cm)

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