

# FC1000

## Optical Frequency Comb



The FC1000 Optical Frequency Combs a compact and flexible fiber-based frequency comb system for direct measurement of absolute optical frequencies. The laser operation relies on the figure 9 mode locking technology, which ensures excellent stability and low-noise operation. The femtosecond laser is ready to use at the press of a single button, and automatic phase lock loops ensure easy stabilization to either a RF or an optical reference. Due to the mature system design including several motorized actuators, our customers report long-term operation where the comb is phase locked over weeks. With a wide range of optional add-ons, we tailor individual systems to customer specific requirements. With the optional ASTRO Extension Package the system offers high mode spacing. Spectral broadening and flattening stages generate the output in the user-defined, visible wavelength range (e.g. 450-700 nm)

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### KEY SPECIFICATIONS

- Comb Spacing 250 MHz
- Accuracy Better  $10^{-14}$  in 120 s
- Stability Better  $5 \times 10^{-13}$  in 1 s
- Operational Range around 520 nm and 1040 nm

### APPLICATIONS

- High Precision CW Laser Stabilization
- FTIR Spectroscopy
- Calibration of Lasers
- High Resolution Spectroscopy
- Low-noise Microwave Generation

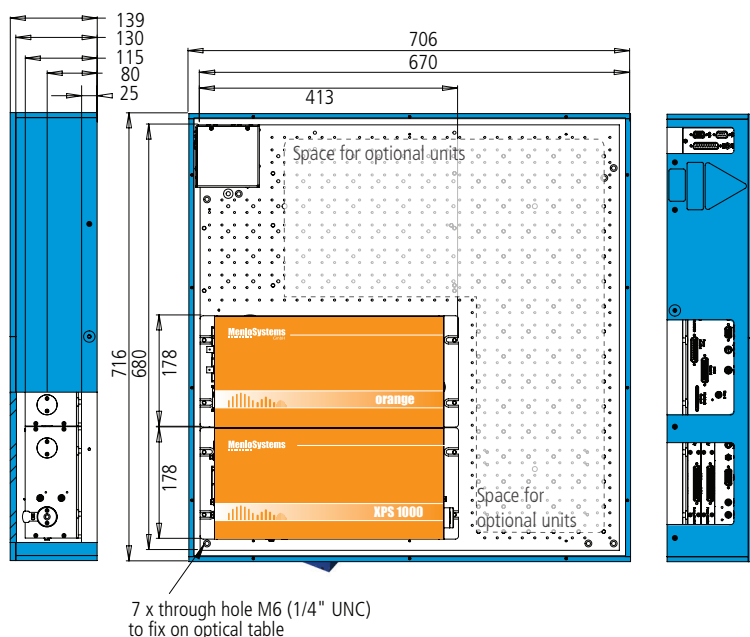
### FEATURES

- Smooth Tuning of Carrier Envelope Offset Frequency
- Fully Fiber-coupled CEO Frequency Generation
- Turnkey Metrology System Fully automated with comb control and data analysis software, designed for continuous operation

### OPTIONS

- **EOM-Phase**  
Required for high-performance phase locking to an optical reference, allowing for sub-Hz comb linewidths.
- **FPC 1000**  
Fabry-Perot Cavity for Mode Filtering
- **orange PULSE-YDFA**  
Delivers high-power near infrared pulses. Several optional amplifiers can be added for multiple measurement ports with high-power output at 1040 nm. (>1 W or >10 W)
- **SHG 520**  
Frequency doubles the output of an additional amplifier to 520 nm.
- **MICROWAVE**  
Ultrastable RF output in the 1 MHz-10 GHz range
- **BDU**  
Beat detection unit with free space or fiber-coupled optics.
- **GPS**  
GPS based 10 MHz reference
- **LLE-SYNCRO**  
Laser locking electronics
- **Yb-TOD-Compressor**  
External compressor for second and third order dispersion
- **WLM-NIR / WLM -VIS**  
Integrated Wavelength Meters

### OPTICAL UNIT OF FC1000-250



# FC1000

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### COMPLETE SOLUTIONS:

The optical frequency comb is a complete system including mode locked Yb-doped fiber laser with PM output, that is spectrally broadened to generate the octave-spanning spectrum, and an f:2f interferometer. The The turn-key, fully hands-off optical setup offers compactness in an extremely robust design and features 24/7 operation with remote access to measured data. A separate rack cabinet houses control units, phase-locked-loops, data acquisition, and displays.

### SPECIFICATIONS

#### FC1000-250

Comb Spacing	250 MHz
Accuracy	$10^{-14}$ in 120 s or same as reference*
Stability	$5 \times 10^{-13}$ in 1 s or same as reference*
Tuning Range of Spacing Between Individual Comb Lines	>2 MHz
Tuning Range of CEO Frequency	>250 MHz
Laser Outputs	two fiber-coupled, linearly polarized, PM output ports
Center Wavelength	1040 nm $\pm$ 10 nm
Spectral Range	>20 nm
Average Output Power	>5 mW from each laser port

### REQUIREMENTS

Input Requirements	10 MHz frequency reference, power level +7 dBm
Operating Voltage	100/115/230 VAC
Frequency	50 to 60 Hz
Power Consumption	<500 W**
Cooling Requirements	no water cooling required
Operating Temperature	22 $\pm$ 5 °C
Optical Unit Dimensions/Weight	706 x 716 mm <sup>2</sup> , approx. 80 kg**
Control Electronics Dimensions/Weight	600 x 800 mm <sup>2</sup> , approx. 140 kg**

\* Whichever applies first. \*\* Standard system configuration.

### ORDERING INFORMATION

Product Code	FC1000-250
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Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.



Invisible laser radiation  
avoid exposure to beam  
Class 4 laser

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