

# SmartComb

## Compact Optical Frequency Comb

**MenloSystems**

### KEY SPECIFICATIONS

- Accuracy Better  $2 \times 10^{-16}$  ( $>100$  s)
- Stability Better  $7 \times 10^{-16}$  in 1 s
- 19" Three Height Unit Rack Mountable
- Class 1 Laser

### APPLICATIONS

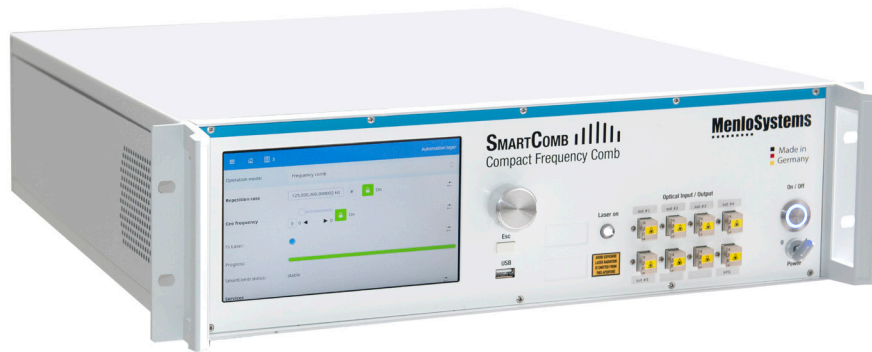
- High Precision CW Laser Stabilization
- Calibration of CW Lasers
- Length Metrology
- Cold Atoms and Ions
- Optical Fiber Links
- LIDAR
- and more

### FEATURES

- Touch Panel Control
- LAN-Interface (full Remote Control)
- Full Automation
- Optical Measurement Input (1.5  $\mu\text{m}$ )
- One Integrated Measurement Port for CW Lasers (630 - 2000 nm)
- Internal 10 MHz OCXO Reference\*

### OPTIONS

- Up to 6 Output Ports (1.5  $\mu\text{m}$ )
- GPS-based 10 MHz Frequency Reference
- Locking Electronics to Stabilize CW Lasers
- NEW: External Amplifiers at Wavelengths between 530 and 2000 nm
- NEW: Rack- and Table-Mounted Extensions
- CSAC Chip-Scale-Atomic-Clock

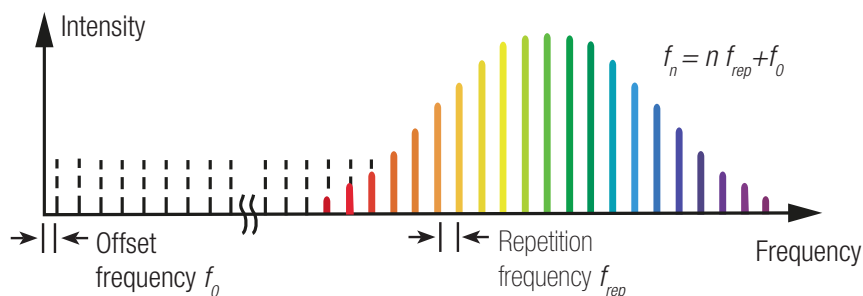


### All your comb applications at your fingertips:

SmartComb is an optical metrology system in a revolutionary compact package. In just 19" 3U it features the first fully automated turn-key optical frequency comb designed and built for use both in- and outside the optics lab. It measures your optical frequency anywhere between 630-2000 nm. Feed in your laser and get the frequency with 14 digits. Alternatively, it provides you with optical reference lines in the same spectral range (choose wavelength on ordering).

With its internal RF-reference, SmartComb can be used as a standalone device. For highest precision measurements, a radio frequency or an optical reference input is available to stabilize the SmartComb.

Due to its modular design, SmartComb is one of the most versatile frequency comb system on the market: Internal units can be adapted to measure different wavelengths or be replaced with amplifiers to provide up to 6 output ports. Additional external modules are retrofitable, to provide higher powers, customized spectra and pulse lengths. SmartComb has a robust design. Its underlying proprietary technology based on figure 9<sup>®</sup> lasers has already been verified onboard of aircraft and sounding rockets, proving it is well-suited even for demanding environments.



The optical comb frequencies  $f_n$  are defined by the repetition frequency  $f_{\text{rep}} = 100$  MHz, the offset frequency  $f_0 = 10$  MHz and an integer number  $n$ .

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## Compact Optical Frequency Comb

### COMPLETE SOLUTION:

The turn-key, fully hands-off optical setup is integrated into a 19" 3U rack, and offers unprecedented compactness. Additionally, the SmartComb can provide stabilized comb output as a seed, thereby extending the range from 530 to 2000 nm with optional retrofittable extensions.

### SPECIFICATIONS (BASIC VERSION)

### SMARTCOMB (CLASS 1 LASER)

Comb Spacing	100 MHz	
Accuracy	$2 \times 10^{-16}$ ( $\tau > 100$ s)*	$1 \times 10^{-14}$ ( $\tau > 1000$ s) <sup>Δ</sup>
Stability (ADEV)	$< 7 \times 10^{-16}$ in 1 s*, $< 5 \times 10^{-17}$ in 1000 s*	$< 5 \times 10^{-13}$ in 1 s <sup>Δ</sup>
Laser Input	one linearly polarized SC/APC PM input port	
Center Wavelength	1.5 μm	
Spectral Range @ 1.5 μm	>25 nm	
Measurement Wavelength	choose one in the 630 - 2000 nm range	

### SPECIAL OPTIONS

### SMARTCOMB (CLASS 3 LASER)

Additional Extensions	Rack- or table-mounted amplifiers and beat detection units in the 530 - 2000 nm range
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\*phase lock to optical reference, <sup>Δ</sup>phase lock to RF reference

### REQUIREMENTS

RF Input Requirements (from External Reference)	10 MHz frequency reference, power level +7 dBm or internal atomic clock
Operating Voltage	100/115/230 VAC
Frequency	50 to 60 Hz
Power Consumption	<100 W
Cooling Requirements	none
Operating Temperature	22 ± 5 °C
Optical Unit Dimensions/Weight	19" x 3U, 17 kg

### ORDERING INFORMATION

Product Code	SmartComb
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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



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