

# ORS-Compact

## Ultrastable Laser System



The ORS-Compact Ultrastable Laser System is designed for high performance in demanding field applications. It delivers ultra-narrow linewidth laser light with outstanding frequency stability.

The system's centerpiece is a high-finesse Fabry-Pérot cavity (cubic spacer with a length of 5 cm) serving as a reference for a CW laser. The cavity is made out of ultra-low expansion glass (ULE) and is operated in vacuum at the point of zero thermal expansion. The reference cavity is actively decoupled from vibrations and acoustically isolated allowing for ultimate performance also in rough laboratory environments. Rigid mounting of the cavity ensures portability without realignment of the optical paths.

The system is operated by the newest generation of Menlo Systems' proprietary SYNCRO controller—a modular electronics platform designed for versatility and intuitive use. It incorporates all required electronics, e.g., a low-noise laser driver and a very fast (analog) servo loop for laser frequency stabilization. The user controls all parameters using either the 7" front-panel touchscreen or a GUI on a remote PC. The onboard software ensures automatic cavity locking and system monitoring.

**MenloSystems**

### KEY SPECIFICATIONS

- Stability  $<2 \times 10^{-15}$  at 1 s
- Linewidth  $<1$  Hz
- Output Power  $>10$  mW
- Wavelength 650–1600 nm

### APPLICATIONS

- Quantum Computing
- Optical Clocks
- Ultra-low Noise Microwave Generation
- Frequency Comb Stabilization
- High Resolution Spectroscopy
- Laser Cooling and Trapping

### OPTIONS

- **ORS-EOM-SBL:**  
EOM Sideband Lock
- **ORS-FNC:**  
Fiber Noise Cancellation
- **ORS-MWL:**  
Multiple-Wavelengths Mirror Coatings
- **ORS-SHG:**  
Second Harmonic Generation
- **ORS-HP:**  
High Output Power
- **ORS-DDRIF:**  
Cavity De-drifting
- **ORS-DSRV:**  
Digital Servo Interface for Stabilisation to External Atomic Transition

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### SPECIFICATIONS

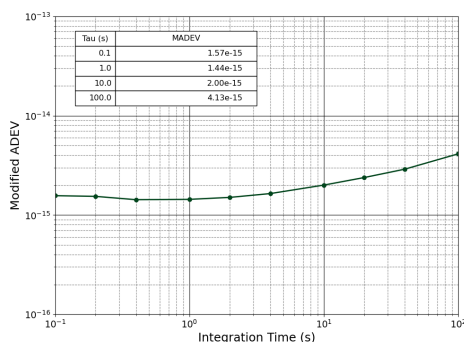
Wavelength	650–1600 nm		
Stability (MADEV at 1 s, Linear Drift Removed)	$<2 \times 10^{-15}$		
Linewidth	$<1$ Hz		
Phase Noise (at 1542 nm*, Laser Source Dependent)	at 1 Hz	-7 dBc/Hz	For all models spurious signals $<-20$ dBc
	at 10 Hz	-27 dBc/Hz	
	at 100 Hz	-45 dBc/Hz	
	at 1000 Hz	-70 dBc/Hz	
*Scaling accordingly for different carrier frequencies			
Output Power	$>10$ mW (FC/APC Connector), high power on request		
Cavity Spacer	5 cm, ULE, Cubic Design (developed in collaboration with the NPL, UK)		
Free Spectral Range	3 GHz		
Linear Drift Rate	approx. 150 mHz/s after 12 months		
Vibration Isolation Platform	included		
System Dimensions / Weight	590 x 800 x 900 mm (16U) / 180 kg		

### REQUIREMENTS

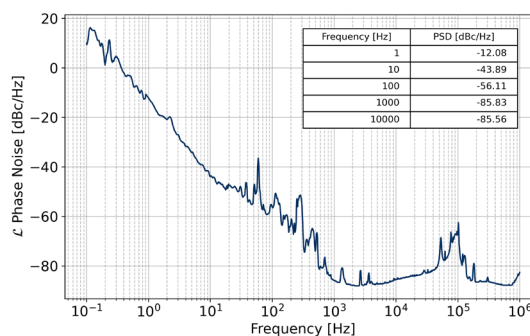
Operating Voltage	100 / 115 / 230 VAC
Line Frequency	50 to 60 Hz
Operating Temperature	$22 \pm 5$ °C
Power Consumption	$<150$ W

### STABILITY AND PHASE NOISE

ORS-Compact Fractional Frequency Stability (1542nm)



ORS-Compact Phase Noise (1542nm)



### ORDERING INFORMATION

<b>Product Code</b>	ORS-Compact ECDL NIR	ORS-Compact ECDL VIS	ORS-Compact1550/1064
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Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire. The cubic cavity is an NPL patented design that is sold under a licensing agreement with the National Physical Laboratory (NPL). This configuration of the NPL cavity is intended for terrestrial use only. For further information on space-customised or space-qualified cavities, please contact NPL.



Invisible laser radiation  
avoid exposure to beam  
Class 3b laser



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