

# ORS

## Ultrastable Laser System



# MenloSystems

### KEY SPECIFICATIONS

- Stability  $<7 \times 10^{-16}$  at 1 s (ORS with ORS-FS-XTAL Option)
- Linewidth  $<1$  Hz
- Output Power  $>10$  mW
- Wavelength  
500–1600 nm (ORS)  
900–1600 nm (with ORS-FS-XTAL)

### APPLICATIONS

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

### OPTIONS

- **ORS-FS-XTAL:**  
Crystalline Mirror Coating
- **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

The Optical Reference System (ORS) is designed for uncompromised performance. It delivers ultra-narrow linewidth laser light with outstanding frequency stability.

The system's centerpiece is a high-finesse Fabry-Pérot cavity (cylindric spacer with a length of 12.1 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. An easy-to-use cavity-locking mechanism 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.

## Ultrastable Laser System

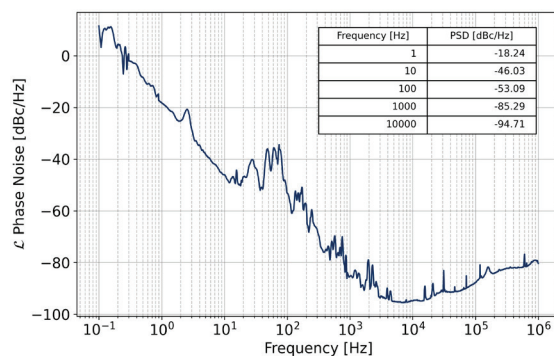
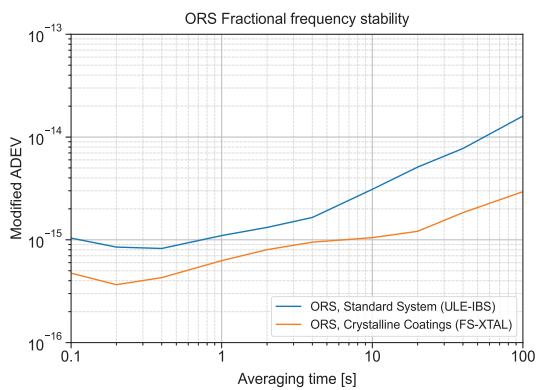
### SPECIFICATIONS

Wavelengths	500–1600 nm (ORS), 900–1600 nm (ORS with ORS-FS-XTAL)		
Stability (MADEV at 1 s, Linear Drift Removed)	<math> <7 \times 10^{-16}</math> (ORS with FS-XTAL Option) <math> <1 \times 10^{-15}</math> (ORS with ULE-IBS)		
Linewidth	<math> <1 \text{ Hz}</math>		
Phase Noise (Laser Source Dependent)		ORS	ORS with ORS-FS-XTAL
	at 1 Hz	-8 dBc/Hz	-10 dBc/Hz
	at 10 Hz	-27 dBc/Hz	-30 dBc/Hz
	at 100 Hz	-47 dBc/Hz	-47 dBc/Hz
	at 1000 Hz	-70 dBc/Hz	-70 dBc/Hz
			For all models spurious signals <math> <-20 \text{ dBc}</math>
Output Power	>10 mW (FC/APC Connector), High Power on Request		
Cavity Spacer	12.1 cm, ULE, Cylindric Design		
Free Spectral Range	1.24 GHz		
Linear Drift Rate	approx. 150 mHz/s		
Vibration Isolation Platform	Included		
Dimensions / Weight	590 x 800 x 1550 mm (29U) / 260 kg		

### REQUIREMENTS

Operating Voltage	100 / 115 / 230 VAC
Line Frequency	50 to 60 Hz
Operating Temperature	$22 \pm 5 \text{ }^\circ\text{C}$
Power Consumption	<math> <150 \text{ W}</math>

### STABILITY AND PHASE NOISE



### ORDERING INFORMATION

**Product Code** ORS

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 3b laser

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