

Evergreen-30 (EG-30)

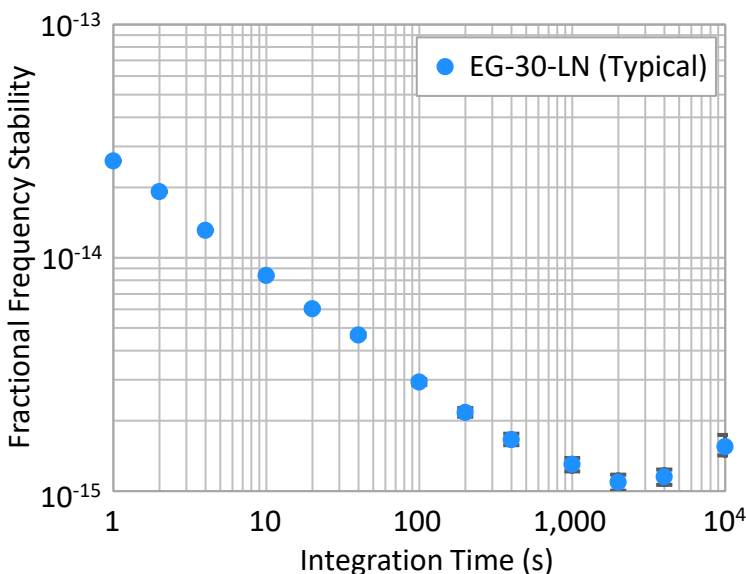
Rackmount Optical Clock



All-in-one solution for microwave and optical timekeeping

Evergreen-30 is a high-performance iodine optical clock in a compact, rackmount package. Pairing precision optical spectroscopy with a robust frequency comb produces microwaves with superior phase noise and short-term stability versus microwave atomic clocks. EG-30 leverages the inherent environmental insensitivity of iodine to provide excellent long-term performance. The unique combination of stability, low drift, and compact size supports applications including GNSS resilience, data center synchronization, coherent radar, and optical metrology.

Optional optical outputs provide an unmodulated 1064 nm wavelength reference and 1560 nm frequency comb to extend clock stability to additional spectral regions.



Features

- Instability 2.5×10^{-14} at 1 s; 5×10^{-15} at 1 d
- Ultralow phase noise
- 100 MHz, 10 MHz, and 1 PPS outputs
- 1064 nm CW and 1560 nm comb output
- Low environmental sensitivity
- 3U 19-inch rackmount package
- Vacuum- and cavity free-design

Vector Atomic, Inc.

6870 Koll Center Parkway, Pleasanton, CA 94566

(925) 249-5959 • www.vectoratomic.com



Evergreen-30 (EG-30)

Rackmount Optical Clock

SPECIFICATIONS AT 25°C

	τ (s)	Typical		Maximum	
		-STD	-LN	-STD	-LN
Allan Deviation – All outputs (Overlapping ADEV; No drift removal)	1	4×10^{-14}	2.5×10^{-14}	8×10^{-14}	4×10^{-14}
	10	1.3×10^{-14}	8×10^{-15}	2.6×10^{-14}	1.3×10^{-14}
	10^2	4×10^{-15}	2.5×10^{-15}	8×10^{-15}	4×10^{-15}
	10^3	3×10^{-15}	1.2×10^{-15}	6×10^{-15}	
	10^4	3×10^{-15}		10^{-14}	
	10^5	5×10^{-15}		10^{-14}	
Drift Rate (Uncompensated)	$< 4 \times 10^{-15}$ /day (Typical)				
Retrace (4 hours off, same conditions)	$< 5 \times 10^{-14}$ (Typical)				

ENVIRONMENTAL SENSITIVITY (TYPICAL)

Temperature	$< 2 \times 10^{-14}$ /°C
Magnetic Field	$< 10^{-14}$ /G
Orientation	$< 5 \times 10^{-14}$ /g; Operational in any orientation

MICROWAVE OUTPUTS

Outputs (Sine wave)	10 MHz: +5 dBm; 100 MHz: +5 dBm		
Phase Noise (dBc/Hz)	Offset	10 MHz	100 MHz
	1 Hz	-124	-105
	10 Hz	-142	-125
	100 Hz	-154	-140
	1 kHz	-164	-150
	10 kHz	-168	-155
	100 kHz	-170	-155
Frequency Adjustment	10^{-18} step, 10^{-9} range, drift compensation feature		

PPS OUTPUT AND SYNC

Amplitude	TTL 3 V into 50 Ω (Input and Output)
Pulse Width	20 μ s
Rise/Fall Time	< 3 ns
Jitter	< 25 ps
Synchronization to PPS Input	< 5 ns



Evergreen-30 (EG-30)

Rackmount Optical Clock

CW LASER OUTPUT (-OPT)

Center Wavelength	1064.490 nm (Vacuum)
Output Power	0.5 mW; No modulation on output
Instability/Environmental Sensitivity	Full ADEV specifications
Optical Frequency Setpoint	281,630,061.8 ± 0.5 MHz; Fixed and factory set

FREQUENCY COMB OUTPUT (-OPT)

Center Wavelength	1560 ± 1 nm
Optical Power	0.5 mW
Bandwidth	> 20 nm FWHM
Repetition Rate	200 MHz

CHASSIS AND INTERFACE

Volume	29 L (17"×5.2"×20"); 3U rackmount
Power	110 – 120 VAC, 50 – 63 Hz
Weight	20 kg
Microwave Connectors	SMA, 50 Ω
Optical Connectors	FC/APC connectors, PM980 fiber, PM1550 fiber
Laser Safety	Class 1 (w/o optical outputs); Class 3B (-OPT)
Control interface and Telemetry	LAN, Touchscreen
Mounting	Tabletop / 19" Rackmount kit included

OPERATING PARAMETERS

Operating Temperature	18 – 35 °C (Non-condensing)
Power Consumption	80 W at 25 °C after 30-minute warm-up

OPTIONS

PART NUMBER: EG-30- ____ - ____

-STD / -LN	Standard performance / Low-noise performance
-OPT	Include optical outputs

