Winters
Electro-Optics, Inc.

MODEL 200

Offset-Locked Iodine-Stabilized He-Ne Laser

The MODEL 200 Offset-Locked Iodine-Stabilized He-Ne Laser is based on the same laser cavity that forms the heart of the world's most popular primary length standard the Model 100 Iodine-Stabilized Laser. It offers the same frequency stability and accuracy of the Model 100 with an 8x increase in output power. The Model 200 has a convenient all-in-one design and is available with an optional fiber optic output.

Features of the MODEL 200

- 633 nm wavelength; 0.8 - 1.0 mW typical output power
- Exceptional long-term accuracy – 2.5 parts in 1011 absolute frequency accuracy (12 kHz)
- Modulation free output
- Iodine cells manufactured and calibrated by the Bureau International des Poids et Mesures (BIPM)
- Fully automatic operation
- Compact all-in-one design
- Optional single-mode fiber optic output

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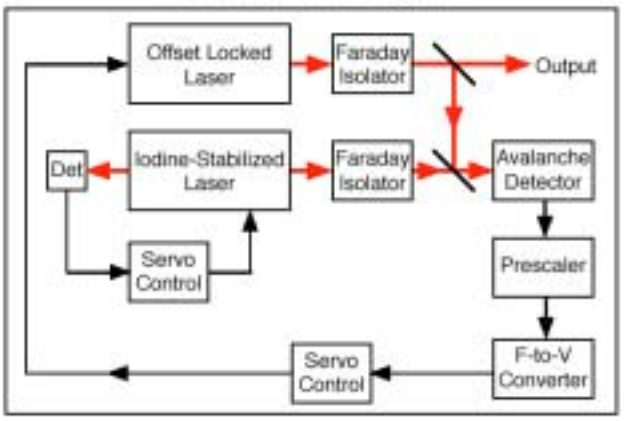
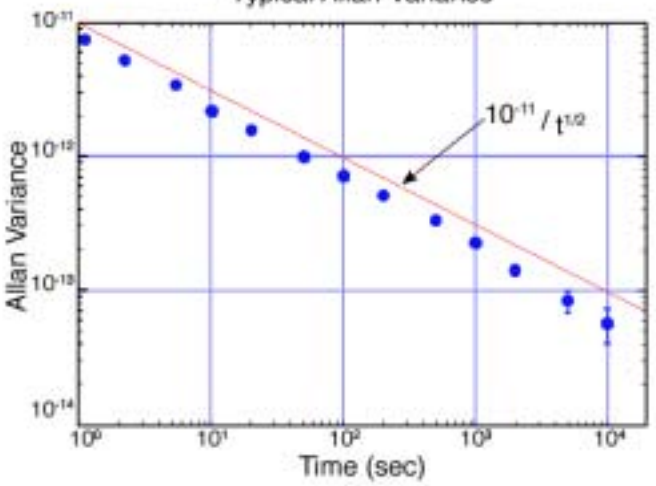
The Model 200 laser was designed to remedy the complications that arise when using an intra-cavity iodine-stabilized laser for high accuracy interferometric measurements. It boasts the same accuracy and stability as the Model 100 Iodine-Stabilized laser, but with a significant increase in output power and without the presence of frequency modulation. It accomplishes this by frequency stabilizing a second He-Ne laser to an iodine-stabilized laser cavity, effectively transferring the frequency accuracy and stability of the iodine-stabilized laser to the higher power, " offset-locked" laser. For convenience, the two laser cavities are located in a single housing, along with all the optics and electronics needed to stabilize both lasers. The result is a very compact, tightly integrated system.

At the heart of the Model 200 laser is the same iodine-stabilized laser found in the Model 100 laser. Its invar cavity spacer has an inherently low coefficient of thermal expansion giving it good long-term stability and a kinematic mirror mount allows precise, easy alignment of the cavity. Wavelength modulation and servo-control of the wavelength is accomplished by a piezoelectric-mounted external cavity mirror. Built-in heterodyne optics and a fast avalanche detector generate a high signal-to-noise rf signal that is used to offset lock the second laser cavity to the iodine-stabilized laser. As with the Model 100, the Model 200 laser is completely automatic, allowing unattended operation and use by "non-specialists." An optional single-mode fiber optic output provides flexibility in the location of the laser, and lends itself to allow for easy integration into almost any experimental setup.

Model 200 Block Diagram



Typical Allan Variance



FREQUENCY ACCURACY:
2.5 parts in 10^{11} absolute frequency accuracy* (12 kHz)

** with respect to the frequencies set by the 1997 CIPM Mise en Pratique for the definition of the meter*

ALLAN VARIANCE:

1×10^{-11}	1 s
3×10^{-12}	10 s
1×10^{-12}	100 s
3×10^{-13}	1000 s

REFERENCE COMPONENT:
Component 'i' of R(127)11-5 transition of $^{127}I_2$

OUTPUT OFFSET FREQUENCY:
+ 110.000 ± 0.003 MHz ‡

‡ *with respect to the reference component*

OUTPUT POWER:
0.6 mW minimum output power
0.8 - 1.0 mW typical output power

PHYSICAL DIMENSIONS:
20 in x 11.75 in x 4 in; 34 lb
(50.8 cm x 30 cm x 10 cm; 15.5 kg.)

ELECTRICAL REQUIREMENTS:
100/120/220/240 VAC; 50/60 Hz; 100 W max.

OPERATING TEMPERATURE RANGE:
15 ° C to 25 ° C

WARRANTY:
1 year on parts and labor

CDRH CLASSIFICATION:
Class II laser product

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