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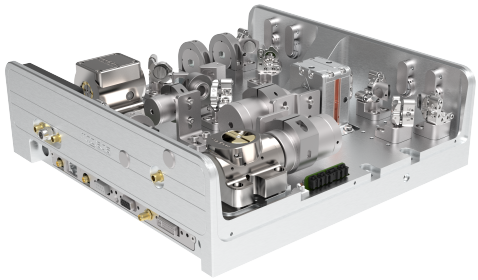
a santec company

Combined tapered amplifier and linear cavity doubler

Model MSHG



Revision 1.00

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Preface

The MOGLabs MSHG combines an external cavity diode laser (ECDL), a MOGLabsMOA tapered amplifier and an MSL linear cavity doubler into a single self-contained system. The MSHG can provide up to 1.5 W of frequency-doubled light in the range of 370–650 nm, for applications including optical lattice clocks, atom cooling, Bose-Einstein condensation, ion trapping, and quantum technology.

The ECDL provides a robust, stable, low linewidth and highly tunable laser system, while the MOA allows for amplification of the laser output power by up to 400 times (+26 dB) while maintaining the linewidth and optical spectrum of the input ECDL seed laser. A secondary seed laser output is included for monitoring or external locking of the fundamental frequency of the seed laser.

The linear second harmonic generation (SHG) cavity is inherently stable and insensitive to vibration, with no adjustability of the cavity alignment. SHG conversion efficiencies of up to 70% can be achieved with freespace input from the tapered amplifier beam. Fibre coupling is available for both harmonic and secondary seed laser output, with typical fibre coupling efficiencies for the harmonic wavelength of 70% or higher.

The MOGLabs MSHG includes the internal MOGLabs mLC electronics for spanning and locking the SHG cavity to resonance. Standard locking is using a piezo modulation and demodulation method (FM-demod), but Pound-Drever Hall locking is also available.

Please let us know if you have any suggestions for improving our products or this document, so that we can make life in the lab better for all.

MOGLabs, Melbourne, Australia
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Safety Precautions

Your safety and the safety of your colleagues depends on careful attention to proper operation of this product. Please read the following safety information before attempting to operate. Also please note several specific and unusual cautionary notes before using the MOGLabs MSL, in addition to the safety precautions that are standard for any electronic equipment.

CAUTION USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE

The MOGLabs MSHG is a frequency-conversion device, not a laser. It is the responsibility of the user to ensure that the fundamental input laser meets the required laser safety specifications.

Light output from the MSHG can be dangerous. Please ensure that appropriate hazard minimisations have been implemented for your environment, such as laser safety goggles, beam blocks, and door interlocks.

- Avoid direct exposure to beams, both from the fundamental input and the harmonic output. Avoid looking directly into either beam.
- The laser chassis should be in good electrical contact to the optical table or other surface, which in turn should be connected to the mains power supply electrical ground.
- Note the safety labels (examples shown in figure below) and heed their warnings.
- The MOGLabs MSHG is designed for use in scientific research laboratories. It should not be used for consumer or medical applications.

Label identification

The International Electrotechnical Commission laser safety standard IEC 60825-1:2007 mandates warning labels that provide information on the wavelength and power of emitted laser radiation, and which show the aperture where laser radiation is emitted. Figures 1 and 2 show examples of these labels and their location on the MSHG.

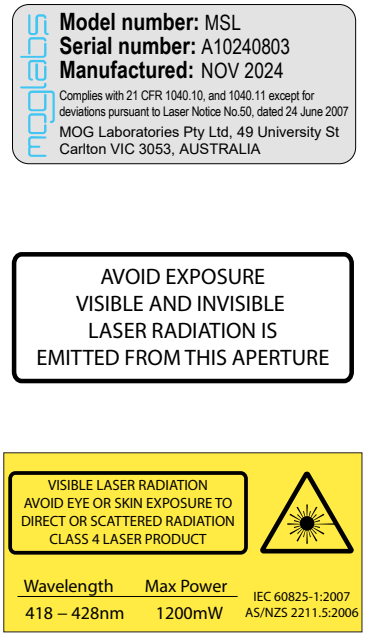

Figure 1: Warning advisory and US FDA compliance labels.

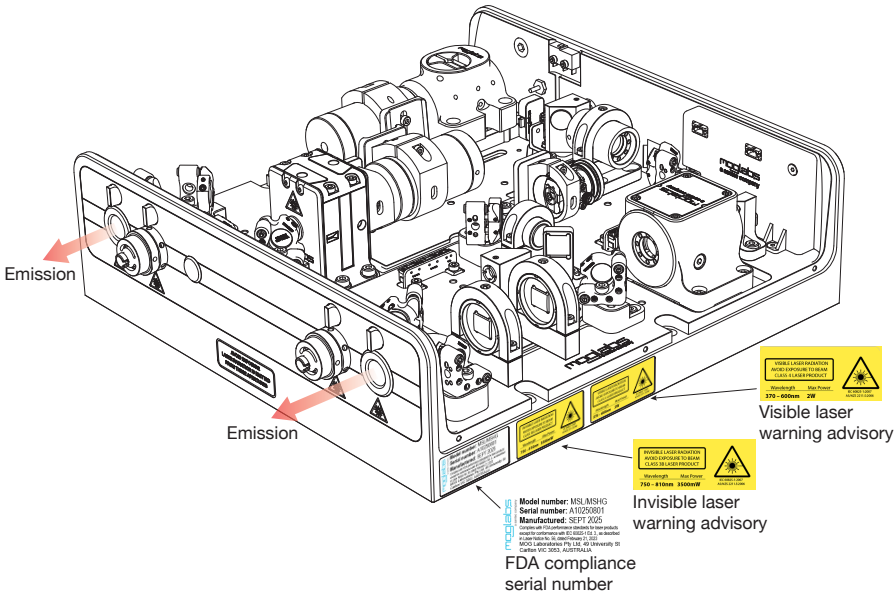

Figure 2: Schematic showing location of warning labels compliant with IEC 60825-1:2007 and the US FDA, and engraved emission warning.

Contents

Bibliography

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