

Picosecond Laser Aesthetic System Specifications & Clinical Whitepaper

DEVICE IDENTIFICATION

This document serves as the official clinical overview and technical datasheet for the Model PS-1064 Picosecond Aesthetic Laser System, a premium Class IV medical device engineered for high-precision dermatological and aesthetic treatments. This whitepaper details the system's internal hardware topology, epidermal protection mechanisms, treatment advantages, and comprehensive specification matrix. The device is intended for use in professional clinical settings by trained practitioners.



INTERNAL HARDWARE TOPOLOGY

The Model PS-1064 employs a state-of-the-art solid-state Nd:YAG laser source

capable of generating picosecond-domain pulse widths. The system architecture integrates a high-stability optical resonator, a proprietary pulse compression module, and a precision articulated arm for optimal beam delivery. This topology ensures consistent, high-peak-power output, facilitating selective photothermolysis with reduced thermal diffusion. The power supply is a high-efficiency, digitally controlled unit designed for global mains compatibility.

EPIDERMAL PROTECTION MECHANISMS

Patient safety and comfort are paramount. The system incorporates a multi-tiered epidermal protection strategy:

1. **Advanced Sapphire Contact Cooling:** A thermoelectrically (TEC) cooled sapphire window at the handpiece tip provides continuous, pre-, and post-cooling to the epidermis, protecting it from thermal injury and significantly enhancing patient comfort.
2. **Dynamic Fluence Management:** The software monitors and adjusts output energy in real-time to compensate for handpiece position and skin impedance variations.
3. **Built-in Safety Interlocks:** The system includes multiple redundant safety interlocks, including a skin contact sensor, emergency stop button, and key switch to prevent inadvertent firing.

TREATMENT ADVANTAGES

The picosecond pulse duration offers distinct clinical advantages over nanosecond systems:

- **Reduced Thermal Damage:** The ultra-short pulse width confines photomechanical effects to the targeted chromophore (e.g., melanin, ink), minimizing damage to surrounding tissues.
- **Enhanced Clearance Rates:** The photoacoustic shockwave effectively fragments tattoo ink and pigmented lesions into smaller particles, which are more efficiently cleared by the body's lymphatic system.
- **Versatility:** The system supports a range of handpieces and spot sizes to effectively treat various indications, from benign pigmented lesions to multi-color tattoos, on a wide array of skin phototypes.

SPECIFICATION MATRIX

The following table provides the core technical specifications for the Model PS-1064.

Parameter	Specification
Laser Type / Wavelength	Nd:YAG / 1064 nm (532 nm optional)

Pulse Duration	450 ps - 750 ps
Maximum Fluence	Up to 2.0 J/cm ²
Spot Size	2 mm - 10 mm
Cooling System	TEC + Sapphire Contact Cooling

REGULATORY COMPLIANCE

The Model PS-1064 is manufactured in accordance with and conforms to the following rigorous international standards, ensuring its safety, performance, and quality:

- CE Marking (Medical Device Directive 93/42/EEC and MDR 2017/745)
- FDA 510(k) Clearance (USA)
- IEC 60601-1 (Medical Electrical Equipment)
- IEC 60601-2-22 (Particular requirements for laser equipment)
- ISO 13485 (Quality Management System for Medical Devices)

The system undergoes exhaustive testing and validation to ensure compliance with these standards prior to shipment.



TECHNICAL SPECIFICATIONS

Detailed device parameters are listed below. (For the specification matrix, please refer to [TABLE_1].)

- Laser Medium: Nd:YAG
- Wavelength(s): 1064 nm (Optional 532 nm via frequency doubling)
- Pulse Duration: 450 ps - 750 ps
- Maximum Fluence: Up to 2.0 J/cm² (dependent on handpiece and spot size)
- Repetition Rate: 1 - 10 Hz (user-selectable)
- Spot Size Range: 2 mm - 10 mm (via interchangeable handpiece optics)
- Aiming Beam: 635 nm, < 1 mW Class 2 laser diode
- Cooling System: Integrated TEC + Sapphire contact cooling with adjustable temperature settings

- Display: 15.6-inch High-Resolution Color Touchscreen
- Dimensions (Main System): 420 mm (W) x 830 mm (D) x 1050 mm (H)
- Weight (Main System): Approx. 85 kg
- Power Supply: 100-240 VAC, 50/60 Hz, 15 A
- Environmental Conditions: Operating Temperature 15-30°C, Humidity 20-80%
(non-condensing)
- Classification: Class IV Laser Product