Laser Marking System for Clear Aligners

1. Function Overview

This system is specifically designed for marking clear aligners. It utilizes a code reader to identify the aligner serial number, automatically extracts the laser marking content and coordinate values for each aligner. The system then automatically adjusts the Z-axis for focus alignment, controls the X and Y-direction beams via a laser galvanometer, and uses a pulsed laser to precisely engrave customized content onto each aligner. The entire process for completing 4 marks takes no more than 3.5 seconds.



2. System Components



2.1 Fiber Laser

- Power: 30W
- Laser Wavelength: 1060nm
- Beam Quality: <1.2 (㎡)
- Laser Type: Pulsed
- Operational Lifespan: ≥100,000 hours
- Cooling: Air-cooled
- Power Supply: 220V 50Hz AC
- Operating Environment: 20℃–26℃, relative humidity <60%

2.2 High-Speed Scanning Galvanometer

- Marking Speed: ≤70,000 mm/s
- Marking Range: 110mm × 110mm
- Minimum Line Width: 0.012mm
- Repeatability Accuracy: ±0.002mm

2.3 Z-Axis Control System

- Stepper Motor: TST42-48P
- Timing Belt Pulley: XL15/82XL-10mm

2.4 Model Acquisition

- Code Reader: MV-ID2013EP

2.5 Industrial Computer

- Touchscreen All-in-One PC

2.6 Automatic Marking Software

- This Windows-based software is exclusively developed for marking clear aligners, enabling text and graphics marking at designated positions.

3. Specifications:

- Net Weight: 45 kg
- Dimensions: 50 × 38 × 63 cm