

Laser Processing Workstation Technical Description

Description:

High-performance Laser Processing Workstation as a turnkey solution for advanced laser-based surface engineering, designed for **precision, versatility, and automation**. Must be built on a **rigid granite base placed on a vibration isolated support frame**, offering mechanical stability for micro- and nano-scale processing applications.

System:

- **Robust Mechanical Platform**
Granite base that ensures vibration damping and thermal stability, supporting highly precise and repeatable operations.
- **Flexible Laser Source Integration**
Compatible with a wide range of industrial-grade ultrafast and CW lasers from leading manufacturers.
- **Advanced Optical Path Features:**
 - **Automated Polarization Control**
 - **Motorized Beam Expansion** for adjustable spot sizes
 - **Programmable Power Attenuation**
 - **Inline Power Monitoring** to maintain process consistency
 - **High-Speed Galvo Scanner** with **telecentric lens** for distortion-free scanning
- **Dual Vision Inspection System:**
 - **Inline Monitoring Camera** for real-time process supervision
 - **Offline Camera** for high-resolution inspection and quality assurance
- **Multi-Axis Motion Compatibility:**
Must be seamlessly integrating with existing or custom **XYZ motion stages** for full 3D process coverage.
- **Intelligent Software Control:**
 - Centralized control interface for all subsystems
 - Must include an **AI-driven assistant** to automate experiment design and optimize processing parameters
 - Must enable device orchestration, logging, and real-time feedback control
 - Users must be able to create custom applications and experimental logic
 - Machine learning for surface inspection from the dual vision system.