JVSOL INDIA INC

ClosedLoop Control System For Laser Scanner and Pyrometer

Laser Additive Manufacturing 3D Printing

Advanced PLC-Based Temperature & Laser Monitoring

| Real-Time Monitoring | PLC Integration | Data Analytics |

System Overview

Comprehensive Industrial Control Solution

ClosedLoop Control System For Laser Scanner and Pyrometer is a professional-grade industrial automation system designed for foundry and manufacturing operations

⚡ Real-Time Control: Siemens S7 PLC integration via Modbus TCP for instant process control at 100ms refresh rates

☐ Temperature Monitoring: Multi-channel pyrometer integration with advanced PID control algorithms

📊 Laser Scanner Integration: Micro-Epsilon scanCONTROL profile measurement with automatic error recovery

💾 Data Management: comprehensive data logging and shift-based reporting

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Key Features & Capabilities

I. Multi-Threaded Architecture: Separate threads for PLC communication, sensor reading, UI updates, and data logging

II. Advanced Temperature Control: Adaptive PID algorithm with setpoint tracking and tolerance zones

III. Laser Profile Measurement: Real-time height profiling with statistical filtering and outlier detection

IV. User Authentication System: Role-based access control with administrator privileges

V. Data Export & Reporting: Excel export with formatted headers and automatic email delivery

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Connection Management
Device Communication Hub

Key Features:

1. PLC Connection: Configure Siemens S7 IP address and Modbus TCP port (default 502)

2. Temperature Sensor: Serial port configuration with 115200 baud rate for pyrometer communication

3. Laser Scanner Status: Real-time connection health monitoring with logging ready indicator

4. Auto-Connect: Enable automatic connection on startup for unattended operation

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Pyrometer Control
Precision Temperature Management

Key Features:

1. Current Readings: Object (1090.6°C), Sensor (25.3°C), Controller (27.1°C), Emissivity (0.950)

2. Temperature Control: Setpoint (800°C), Tolerance (±100°C), Status indicator with color coding
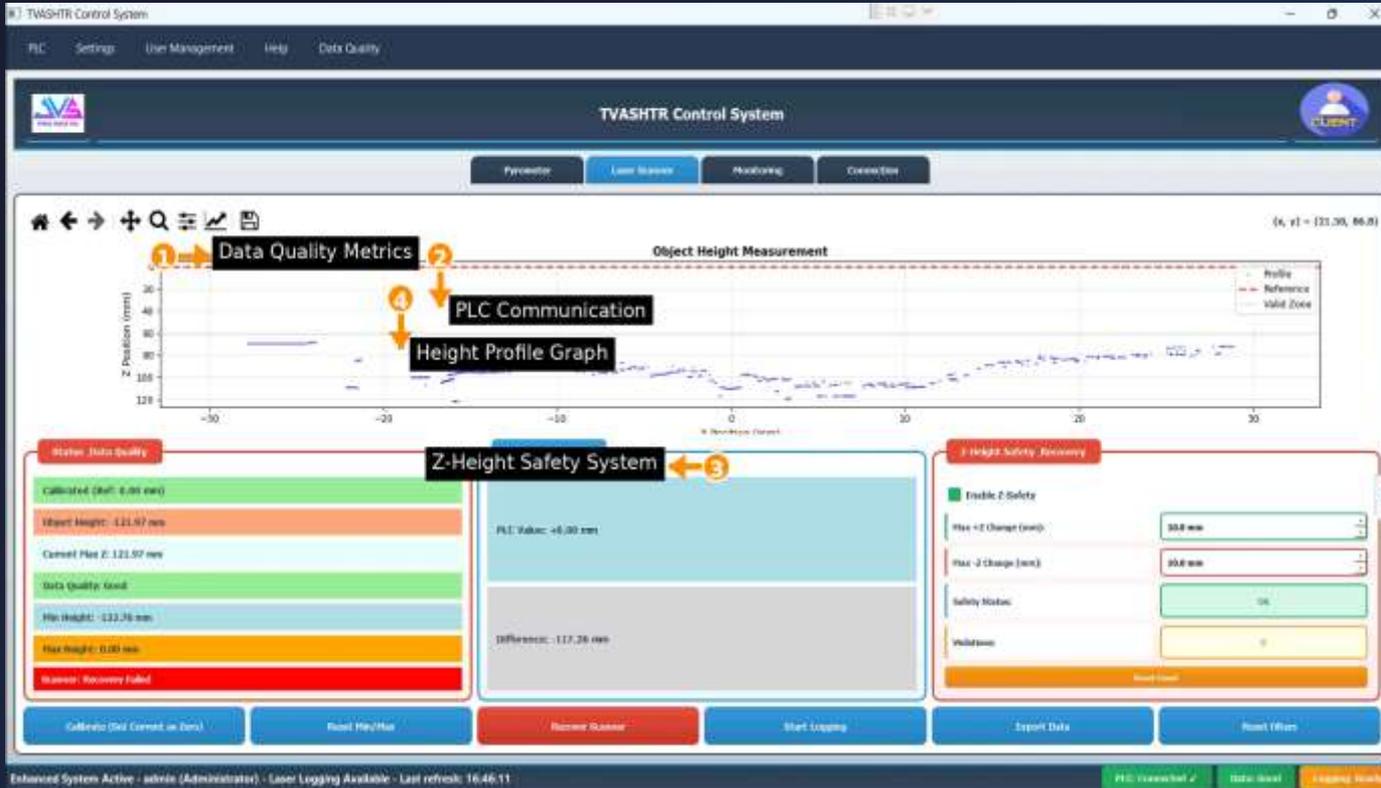
3. Power Control: Manual override option, laser minimum power (50W), calculated power output (701W)

4. Live Graph: Real-time temperature plotting with setpoint line and tolerance band visualization

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Laser Scanner System
Profile Measurement & Data Quality

Key Features:

1. Quality Metrics: Calibrated reference (0.00mm), Object height (-121.97mm), Min/Max tracking, Data quality status

2. PLC Sync: Real-time PLC value comparison with difference tracking for validation

3. Safety System: Z-height limit monitoring with ±10.0mm thresholds, violation counter, and reset capability

4. Profile Visualization: X-Y position height mapping with reference line and valid measurement zone

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Integrated Dashboard
Combined Process Monitoring

Key Features:

1. Temperature Monitor: Live object temperature (1134.6°C) with setpoint (800°C), tolerance bands, and trend graph

2. Height Monitor: Real-time laser height measurement (-73.02mm) with data quality indicator and profile graph

3. System Controls: Disconnect sensors, start/stop logging, calibration functions, and parameter adjustments

4. Export Features: One-click Excel export with timestamped data, formatted headers, and email integration

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I.   PLC Platform: Siemens S7 Series via Modbus TCP/IP (Port 502)

II. Pyrometer: Serial RS-485/232 communication @ 115200 baud

III. Laser Scanner: Micro-Epsilon scanCONTROL 2900

IV. Performance: 100ms PLC refresh, 1s temperature sampling, 50-100Hz laser scan rate

V.   Multi-Threading: Dedicated threads for PLC, sensors, UI, and data logging

VI. Memory Management: Circular buffers prevent memory leaks (10,000 point capacity)

User Interface & Workflow
Intuitive Design for Industrial Operations

I.   Tabbed Interface: Four main tabs (Pyrometer, Laser Scanner, Monitoring, Connection)

II.   Status Bar: Real-time system status with PLC connection, data quality, and logging indicators

III.   Matplotlib Integration: Professional-grade plotting with zoom, pan, and export capabilities

IV.   Color-Coded Status: Visual indicators for connection states and alarm conditions

V.   Interactive Controls: Spin boxes, sliders, and buttons for parameter adjustment

VI.   Data Export: Excel export with formatted headers and color-coded sheets

VII.   Operator-Friendly: Large fonts and high-contrast colors for industrial environments

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Benefits & Competitive Advantages

Why Choose ClosedLoop Control System For Laser Scanner and Pyrometer Control System

🎯 Production Efficiency: Automatic error recovery and failover minimize production interruptions

📈 Quality Assurance: Real-time data quality checks ensure consistent product quality

💰 Cost Savings: Precise temperature control reduces energy waste by up to 15%

🔒 Security & Compliance: Role-based authentication and audit trails for regulatory compliance

Modular Architecture: Easy addition of new sensors or PLCs without system redesign

Data Integration: enables enterprise reporting and ERP integration

Industry 4.0 Ready: MQTT support for smart factory implementations

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Ready to Transform Your Operations?

ClosedLoop Control System For Laser Scanner and Pyrometer Control System delivers enterprise-grade industrial automation with proven reliability, comprehensive monitoring, and seamless integration capabilities.

THANKYOU

Contact Us

✉@ Email: mahaboob@jvsol.co.in

🌐 Website: www.jvsol.co.in

📱 Phone: +91-7795345309, 9380905907

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