smart4.0
INTELLIGENT PROCESS CONTROL

CONNECTED CONTROL.
COMPLETE CONFIDENCE.

Smart4.0 delivers real-time visibility, advanced analytics, and reliable performance—so you can improve efficiency, reduce downtime, and drive results.

INDUSTRY 4.0 READY
Built for modern connectivity and seamless integration.

SCALABLE SOLUTIONS
Flexible systems that grow with your operations.

SECURE BY DESIGN
Advanced protection for your data and your process.

BUILT FOR RELIABILITY
Engineered to perform in the toughest environments.

BACKED BY EXPERTS
Trusted support from a team that knows your industry.



DISCOVER THE POWER OF SMART CONNECTED CONTROL.
LEARN MORE AT THERMALPRODUCTSOLUTIONS.COM

Improve Efficiency | Reduce Downtime | Drive Results

TPS™ Thermal Product Solutions

INTELLIGENT CONTROL. ADVANCED FLEXIBILITY. TOTAL PROCESS CONFIDENCE.

SMART4.0 TOTAL PROCESS CONTROL SYSTEMS AND MACHINEPULSE PERFORMANCE MONITORING *BACKED BY INTELLIGENT DESIGN: US PATENT US 12,467,797 B2*

The Smart4.0™ Controller from Thermal Product Solutions is a next-generation control platform engineered to deliver powerful process automation, intuitive operation, and advanced chamber management across a wide range of demanding applications.

Built around a modern graphical interface and modular logic architecture, Smart4.0 combines the precision expected by engineers with the simplicity appreciated by operators. Whether managing environmental chambers, industrial ovens, or custom thermal systems, Smart4.0 provides complete visibility and control of critical processes in real time.

At the core of Smart4.0 is an advanced block-based control engine that intelligently maps inputs, outputs, and function logic into a fully configurable control ecosystem. This flexible architecture allows the system to adapt to virtually any application while maintaining reliable, repeatable process performance.

Operators benefit from an intuitive touchscreen featuring live system monitoring, profile management, alarm handling, trending, and programmable control logic, all designed to simplify operation and reduce setup time. Engineers and maintenance personnel gain powerful configuration tools, detailed diagnostics, and scalable expansion capabilities for future system growth.

The Smart4.0™ Controller supports a wide range of analog and digital inputs, including RTDs, thermocouples, switches, pressure devices, and process sensors. Integrated communication support for WiFi, Optional Cellular Communications, Ethernet, and RS485 enables seamless connectivity with modern industrial networks and peripheral equipment.

Advanced PID loop control, event handling, programmable timers, compressor staging, alarm management, and logic gate functions work together to provide precise environmental and process control across complex applications. Built-in safety logic and configurable alarms help protect equipment, products, and operators while maximizing uptime and operational efficiency.

From laboratory research and aerospace qualification testing to production processing and industrial thermal applications, Smart4.0 delivers the intelligence, flexibility, and performance required for modern process control.



thermalproductsolutions.com | 1-800-586-2473 | 2821 Old Route 15, New Columbia, PA 17856





Smart4.0 Features and Controls

POWERFUL PROCESS CONTROL WITH AN *INTUITIVE USER EXPERIENCE*

The Smart4.0™ Controller delivers an intuitive, operator-focused user experience designed to simplify complex thermal processes while providing complete system visibility. Behind the interface, advanced control architecture continuously manages process conditions with precision PID control, intelligent logic functions, and integrated safety monitoring providing operators and engineers total confidence in process performance, reliability, and repeatability.

User Interface & Display

The Smart4.0™ graphical user interface provides intuitive touchscreen operation with real-time process monitoring and system visualization.

Dedicated screens for Home, Profiles, Trends, Logic, Alarms, Settings, and About functions provide centralized process management.

Operators can view live process conditions, adjust setpoints, monitor alarms, and manage system operation through an easy-to-navigate interface.

Data Logging & Trending

Real-time and historical trend monitoring provides continuous process visibility and operational data tracking.

The system supports configurable data storage, historical alarm tracking, USB-based data export, automatic data management functions, and configuration backup and restoration capability.

Alarm & Safety Features

The Smart4.0™ alarm management system provides real-time monitoring with Critical, Warning, and Notification alarm levels.

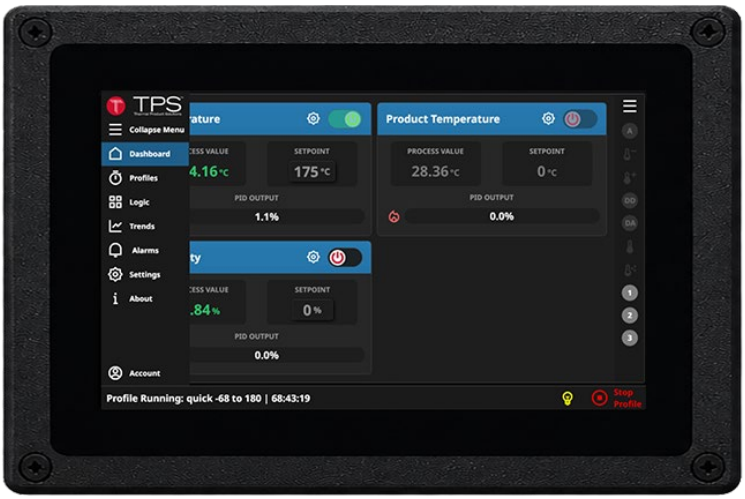
The platform supports latching and non-latching alarm configurations, alarm acknowledgment functionality, audible alarm outputs, alarm history tracking, safety interlock integration, compressor protection logic, and automatic equipment

Software Features

The Smart4.0™ Controller Framework supports live system monitoring, profile creation and editing, configuration import/export, automatic configuration saving, software diagnostics, modular software architecture, logic simulation and testing tools, and future software expansion capability.

Engineering & Service Features

Built-in engineering and maintenance tools include live I/O diagnostics, hardware communication verification, test input simulation, logic visualization, connection diagnostics, detailed block parameter configuration, USB configuration deployment, and advanced troubleshooting capability to simplify system setup, service, and long-term maintenance.



Easily Configurable Dashboards
with user-friendly interfaces for process and alarm monitoring.

Smart4.0 Technical Features

TOTAL PROCESS INTELLIGENCE, PRECISION CONTROL, AND REAL-TIME VISIBILITY ENGINEERED INTO ONE INTUITIVE PLATFORM FOR *COMPLETE CONFIDENCE IN EVERY CYCLE.*

User Interface & Operation

- 7, 10, & 15-inch modern touchscreens standard on most units; additional sizes available
- Real-time system status monitoring
- Simple Start / Stop operation
- Adjustable setpoints and channel controls
- Home, Profiles, Trends, Logic, Alarms, Settings, & About screens
- Idle, Running, and Steady-State status indication
- Status bar indicators for alarms, profile progress, & scheduled profiles
- User-friendly navigation designed for both operators and engineers
- Local USB configuration save/load capability

Controller

- High-performance embedded computing module designed for industrial applications
- Industrial single-board computer architecture
- Custom Linux-based operating platform
- Configurable Input, Output, and Function Blocks
- Flexible process customization for unique chamber applications
- Scalable software architecture for future expansion
- Analog Expansion Module:
  - 4 Analog inputs (0–10V, 0–24mA)
  - 2 Analog outputs (0–10V, 0–20mA)
  - 8 Thermocouple inputs (no RTD)
- Mixed Expansion Module:
  - 8 Digital inputs
  - 12 Digital outputs
  - 1 RTD input
  - 1 Analog Input (0–10V, 0–24mA)
- Communications and Connectivity:
  - 1 Canbus Connection
  - 2 RS485 Connections
  - 2 Ethernet Ports
  - 2 USB-A Ports
  - 1 USB-C Port
  - 1 HDMI Display Out
  - MicroSD card slot
  - Wifi / Bluetooth
  - Cellular (Optioned)
  - Industrial network compatibility

PID & Process Control

- Advanced PID loop control
- Closed-loop process regulation
- Adjustable proportional, integral, and derivative tuning
- Multi-channel process capability
- Ramp and soak style process control support
- PWM output functionality
- Setpoint-based process management

Alarm & Safety Management

- Real-time alarm monitoring
- Critical, Warning, and Notification alarm levels
- Latching and non-latching alarms
- Audible alarm support
- Alarm acknowledgment and history tracking
- Equipment shutdown protection
- Safety interlock integration
- Compressor and over-temperature protection logic



Designed for lasting performance, the Smart4.0™ Controller platform includes guaranteed hardware support through at least 2036, helping customers confidently plan for long-term operational continuity

smart4.0
INTELLIGENT PROCESS CONTROL

MachinePulse
IOT DATA & ANALYTICS PLATFORM

CONNECTED CONTROL.
COMPLETE CONFIDENCE.

Smart4.0™ Control + MachinePulse™ IoT
= Total Process Control and Monitoring

- **PRECISE CONTROL**
  Advanced automation for consistent results.
- **FLEXIBLE LOGIC**
  Adaptable to your process, your way.
- **ALARM & SAFETY**
  Real-time alerts and protection you can trust.
- **REAL-TIME MONITORING**
  Live data. Anytime. Anywhere.
- **MULTIPLE I/O & COMMUNICATIONS**
  Seamless integration. Maximum connectivity.

- REAL-TIME VISIBILITY
- REMOTE MONITORING
- DATA ANALYTICS
- ALARM NOTIFICATIONS
- SECURE CLOUD STORAGE



INDUSTRY 4.0 READY | SCALABLE SOLUTIONS | SECURE BY DESIGN | BUILT FOR RELIABILITY | BACKED BY EXPERTS

DISCOVER THE POWER OF SMART CONNECTED CONTROL.
LEARN MORE AT THERMALPRODUCTSOLUTIONS.COM

SMARTER CONTROL. STRONGER PERFORMANCE.

Improve efficiency. | Reduce downtime. | Drive results.

INTELLIGENT PROCESS CONTROL MEETS REAL-TIME REMOTE MONITORING FOR *COMPLETE THERMAL SYSTEM VISIBILITY AND PERFORMANCE OPTIMIZATION*

When paired with the MachinePulse IoT System from Thermal Product Solutions, the Smart4.0™ Controller transforms into a fully connected intelligent process management platform delivering total process control and monitoring across your operation, backed by intelligent design: **US Patent US 12,467,797 B2**.

Smart4.0™ and the MachinePulse IoT system are engineered to work together as a unified platform for custom or retrofit solutions, enabling seamless upgrades to existing thermal systems while extending full remote visibility and control.

Smart4.0 delivers advanced on-machine control and process execution, while MachinePulse adds secure cloud-based monitoring, analytics, and system-wide data access, creating a complete end-to-end retrofit pathway that enhances legacy equipment without major hardware replacement.

Smart4.0 provides precise real-time control of chamber functions, alarms, profiles, and critical process variables, while MachinePulse continuously captures and stores operational data for remote visibility, analytics, and proactive system oversight.

Together, they give operators, engineers, and maintenance teams instant access to live equipment status, trend data, alarm conditions, and performance dashboards through a secure browser-based interface.

The result is smarter process management, faster response to abnormalities, improved uptime, enhanced preventative maintenance capabilities, and complete confidence in thermal process performance whether operating locally or monitoring equipment remotely across an entire facility.