

Service and Support

Signature Control is committed to optimizing each customer's return on investment in SmartTrac® Solutions. Recognizing that support is a critical component of ongoing solution success, Signature Control offers service options to address the various customer budgetary and uptime requirements.

Annual service plans include an on-site calibration and maintenance visit to ensure optimal performance despite changing plant and environmental conditions. Telephone support and remote troubleshooting assist in quickly resolving unforeseen events. Further, emergency service is available, with a maximum 72-hour response time.

Beyond direct support, Signature Control contributes to each customer's return on investment through ongoing product refinements and updates, available through service or software support agreements.

Signature Control Systems

Signature Control Systems was founded in 1995 with the mission to develop intelligent monitoring and control products for a broad range of materials and chemical processing applications. To support this mission, Signature has assembled a highly skilled technical team with core competencies in the areas of software development and engineering, mathematical algorithms, control engineering, electrical engineering, chemistry, and materials science.

Based in Denver, Colorado, Signature Control holds multiple patents, and markets its Intelligent Process Control systems for polymer bonding, laminating, and forming to the thermoset molding, rubber, thermoplastics, and engineered wood products industries.

SmartTrac Specifications

Computer

- Allen Bradley industrial PC
- Windows Operating System
- 17" flat panel touch screen
- Ethernet network ready
- CD and floppy drive

Control Inputs & Outputs

- Two discrete inputs (press closed or cycle start)
- One or two discrete outputs
- I/O may be 5-32VDC, 120 VAC 60 Hz, or 220 VAC 50 Hz

Software

- Graphical user interface completely controlled from the touch screen
- Statistical database tracks and correlates cure times, batch changes, shift changes and user defined data features
- Open database accessible from user applications

Enclosure

- NEMA 12 rated
- 22.5" H x 21.75" W x 13.5" D
- Integrated cooling fan
- Internal temperature monitor
- Keyed on/off switch
- Rear & side access doors
- Pedestal or pendant mounted

Sensors

- 40,000 psi operating pressure
- 450° F operating temperature
- Tool steel housing
- Coax cable connector
- High wear resistant ceramic face
- Can be used with conductive fibers and fillers

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 **Signature Control Systems**
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SmartTrac®

INTELLIGENT PROCESS CONTROL™ SYSTEM



**Maximizing
Productivity,
Quality and
Machine Utilization
in Compression,
Injection & Transfer Molding**

SmartTrac® Intelligent Process Control systems optimize press cure times by detecting the optimal point of cure from within the mold. By eliminating the safety margins included in fixed controller cycle times, SmartTrac reduces press cycle times by up to 40%, lowering part cost, relieving capacity constraints, improving quality, increasing machine utilization, and reducing scrap.

The faster cycle times and increased productivity delivered by SmartTrac often result in a payback period measured in a few months. Further savings are realized from reduced waste and scrap, faster press start-up and mold changes, and ongoing improvement in product quality that compensates for material, press, environmental or operator variations.

SmartTrac Intelligent Process Control systems are dramatically improving throughput and part quality in the thermoset, rubber, thermoplastics, and engineered wood products molding industries.

► Improves Productivity

up to 40%, reducing part cost and delivering payback under one year

► Improves Quality

by dramatically reducing cure variation caused by changing process conditions

► Improves Machine Utilization

by speeding startup and significantly reducing scrap

► Improves Process Control

through decisive trouble shooting for analyzing material flow and variations

 **Signature Control Systems**
Intelligent Process Control™

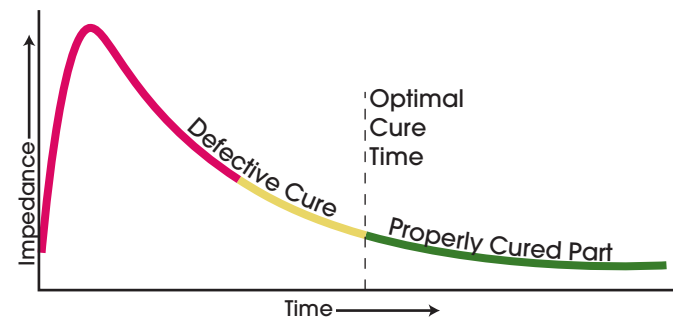
The SmartTrac® Intelligent Process Controller

Achieving New Levels of Press Productivity

The View from Inside the Mold

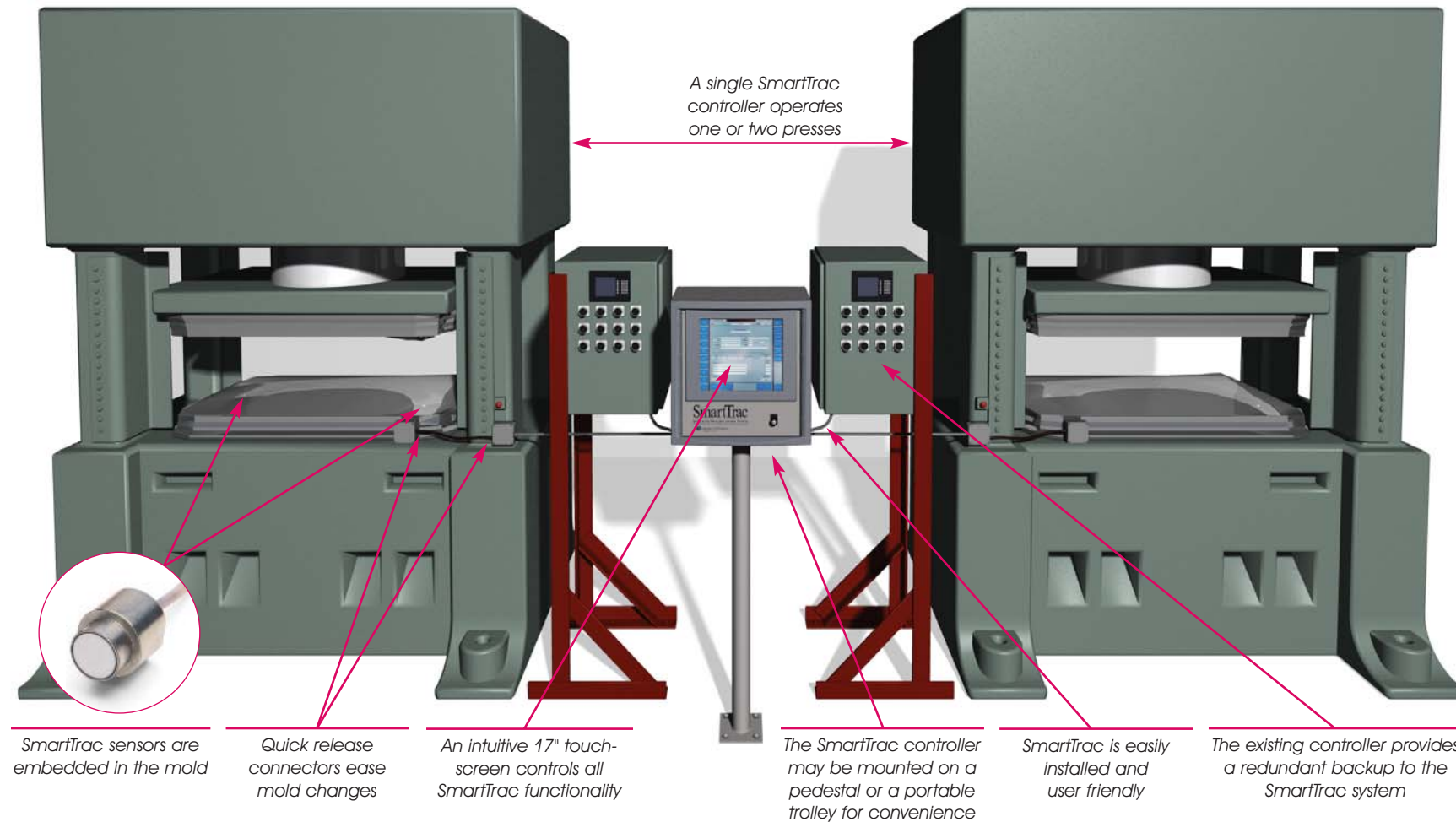
Because it is impossible to “see” the chemical and physical changes within a mold during the cure process, manufacturers must include a safety margin of time within each press cycle to allow for inherent material and processing variations. These margins tend to grow over time, resulting in a significant compromise in plant productivity and product quality.

SmartTrac® Intelligent Process Control systems detect the precise point of cure by monitoring changes in the material’s electrical impedance via sensors mounted directly in the mold. Sophisticated software algorithms study the data curve to detect the optimal cure point for each press cycle, achieving maximum plant productivity and product quality.



By removing the safety factor, SmartTrac Intelligent Process Control systems deliver a predictable 15% to 50% reduction in press cure times. Because each part is accurately and consistently cured, scrap waste and product returns are dramatically reduced. Press start-up and mold change times are also reduced as SmartTrac adapts each press cycle to the present conditions, without waiting for press and material temperatures to stabilize.

SmartTrac sensors are easily installed in the mold, either by the plant machine shop, or with the assistance of a Signature Control System’s tooling partner. The SmartTrac sensors are exceptionally durable, withstanding pressures up to 40,000 psi and temperatures up to 450°F.



SmartTrac sensors are embedded in the mold

Quick release connectors ease mold changes

An intuitive 17" touch-screen controls all SmartTrac functionality

The SmartTrac controller may be mounted on a pedestal or a portable trolley for convenience

SmartTrac is easily installed and user friendly

The existing controller provides a redundant backup to the SmartTrac system

Configurable to Every Operation

A single SmartTrac controller simultaneously monitors up to four sensors. By utilizing multiple sensors within a mold, SmartTrac facilitates a consistent cure throughout the part — opening the press only when all sensors indicate the cure is complete.

A single SmartTrac controller will operate two presses, each with two sensors. Operation of each press is completely independent — an operator can set up one press while the second is in production.

The SmartTrac system maintains a library of all mold and material algorithms developed for each press, facilitating rapid mold and process changes when required.

Three Modes of Operations

SmartTrac® provides three modes of operation, allowing for a straightforward integration into each plant’s operations.

Monitor Mode:

During the initial installation and algorithm configuration, SmartTrac operates in monitor mode, recording all sensor data but not signaling the press release. Monitor mode allows the press operator to vary procedures while viewing the effect on the cure impedance curve.

Control Mode:

In control mode, SmartTrac monitors the mold sensors, detects the optimal point of cure, and signals the press to open, maximizing press productivity, part quality and machine utilization.

Cell Mode:

When multiple presses are operated as a “cell” by a single operator, SmartTrac is configured with a fixed minimum cure time to remove the majority of the safety factor built into the manual process. SmartTrac will extend the cure time only if the cure takes longer than the minimum assigned time, ensuring quality if conditions suddenly change dramatically. This mode allows SmartTrac to balance the cell (up to two presses per SmartTrac controller) and improve productivity without upsetting the cell’s operations.

In all modes, the existing press controllers operate as a redundant backup to the SmartTrac system. Once in operation, the SmartTrac controller runs in the background without requiring operator oversight.

Operational Knowledge Database

SmartTrac records all operational data within an open database, accessible from any computer across an Ethernet network. The database includes data for every sensor on every cycle, including the mold, operator, material, impedance curves, and optional sensor readings such as temperature or pressure. Studying this data over time reveals the effects of incoming variations on the cure cycle, allowing ongoing refinement in operations to continuously improve the molding process. The database is also accessible for backup or consolidation with other SmartTrac controller databases.