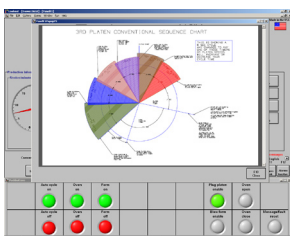
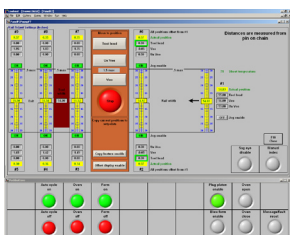


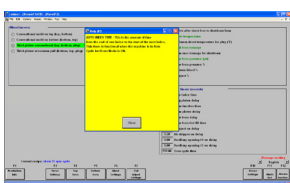
Oven Layout Screen



Thermoforming Process Screen



Index / Rail Screen



Help Feature

## Taking Intelligent Thermoforming Control Solutions to a New Level

**Smart Control** is Brown's integrated intelligence control software that enables the machine to monitor system performance, notify operators of out-of-range operation, make critical machine adjustments automatically, and communicate preventative maintenance needs.

Machine intelligence assists operators with Process Control, Servo Control, Form Station, Index, Rails, Ovens, Maintenance and Safety.

### Smart Control is available in two packages:

**Basic Smart Control** - comes standard on Quad Series equipment and includes a variety of intelligent software features.

#### Process:

- On/off machine functions embedded in HMI
- Forming process display with real-time visual feedback and hot links for easy adjustment
- Trending capabilities to monitor key process statistics
- Help feature for specific machine functions
- Password protection with default levels of security
- Note section within the recipe
- Historic log of all HMI operator actions
- Strain gauges incorporated for over tonnage protection within the form station
- E-stops and guard door identification

#### Servo:

- Display warning and light when servo motor and drives are approaching fault values
- Diagnostics of the servo motion controller system

#### Ovens:

- Mold layouts within the oven screen
- Scaled dimensions and shot lines within the oven screen

- Ovens turns on sequentially to minimize power consumption
- Sheet sag eye oven protection circuitry

#### 3rd Motion:

- 3rd motion teach mode
- 3rd motion protection circuit:
  - Pressurized lubrication system circuit
  - Operator initiated start-up mode
  - Cold sheet plug assist protection circuit

#### Index & Rails:

- Rail protection circuitry to prevent rail/mold damage
- Self-adjusting index motor tension system
- Maintenance:
  - Preventative maintenance scheduling

#### Green Technology:

- Regeneration of servo power for reuse
- Independent transformer to allow Supervisory PC to remain under power.

**Expanded Smart Control** – is available as an option and adds even more features for intelligent system performance.

#### Process:

- Vacuum and pressure circuits trending
- Self-adjusting head adjust to maintain a preset forming tonnage within the process recipe
- Thermocouple control for temperature control unit adjustment and upper/lower tool alignment protection

#### Servo:

- Self-adjusting electronic regulators for form station balance cylinders to optimize servo motor efficiency
- Self-adjusting electronic regulators for form station balance cylinders to optimize servo motor efficiency

## Keeping You in Control

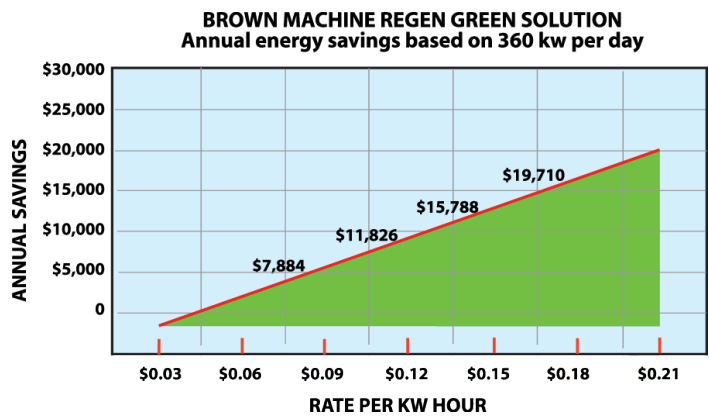
At Brown we believe in preventing problems for customers, so you won't find any "black boxes" on Brown Machines. We know that proprietary control systems require maintenance and programming by the OEM eventually leads to machine downtime. That's why we have chosen well-known major brands for our instrumentation and control systems suppliers. Components are easy to locate and software platforms are easy to update, keeping you in control.

## Brown Also Brings Green Technology to Thermoforming

The new Quad Series incorporates a number of features with energy savings in mind. One major innovation is in the servo system. Traditional servo systems utilize a dynamic brake resistor that dissipates in the form of heat into the atmosphere during the servo deceleration phase. The new Quad Series incorporates an electric power regeneration system that distributes power back into the power buss for reuse. The net result of the Brown regenerating system is a reduction in operational energy costs. This new feature, coupled with maximum servo efficiencies, oven

insulation preventing heat loss, and minimal air usage within the machine and tool designs provide even more energy savings, and economically attractive operational solutions.

The graph illustrates annual savings based on kw costs.



## Leadership Through Innovation, Quality and Service

Serving the thermoforming industry since 1952, Brown Machine has earned a reputation for providing the most innovative, durable and dependable plastics equipment in the industry. With engineering and manufacturing capabilities in Beaverton, Michigan, Brown provides equipment, tooling and services to produce a wide range of thermoformed products in the following markets:

- Disposable Cup
- Food Packaging
- Housing
- Point-of-Purchase Packaging
- Material Handling
- Horticultural
- Automotive
- Lid and Plate
- Recreational Equipment
- Appliance

Today our equipment is producing products from a wide range of materials including:

- Polystyrene
- Polyethylene
- PVC
- Composites
- Polypropylene
- EPS Foam
- TPO
- Acrylic
- APET
- ABS
- Barrier Materials

Globally, Brown Machine totally supports its growing capital equipment business with a full complement of:

- Retrofit Kits
- Service: 24-7
- Remanufacturing
- Parts: 24-7

Continuous Thermoformers

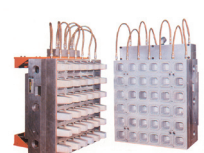
Cut Sheet Thermoformers

Horizontal & Vertical Trim Presses

Lip Rolling Systems

Machines for Custom Applications

Tooling, Parts & Service



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A global leader of thermoforming technologies since 1952, Brown Machine LLC engineers and builds a complete standard line of continuous & cut-sheet thermoforming equipment as well as related tooling & peripheral equipment.

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