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Brown Machine LLC, NPE 2006 News (Booth #S1409):

New Brown Machine Control Systems Are User Friendly and Employ NO Proprietary Software or Hardware Components

Beaverton, MI – Brown Machine announces the availability of its new “Series 4.0” Machine Control and its “Level 2” Machine Control. Both control systems provide the user with a number of operating advantages because they are flexible, adaptable, easy to maintain, and rely on open architecture that uses **non-proprietary** hardware and software. A **“No-Black Box Solution”**. These control systems are standard on all CS and SRS Series continuous thermoformers and higher end cut sheet thermoformers built by Brown (optionally available on all other Brown thermoformers and trim presses).

Brown Series 4.0 Continuous Machine Control Systems use a distributed **open architecture** control system based upon a modular design for the supervisory and secondary controllers. All programmable process parameters and heater functions are controlled through an Allen-Bradley SLC-500 series solid state programmable controller. An Ormec motion controller is used for precise, high-speed servo movements and “real time” form function timing.

An industrial-grade PC provides long life and is less vulnerable to noise and vibration interference. The PC is equipped with a user-friendly, **Windows XP™** operating system; USB connected touch-screen monitor, mouse, and keyboard; Ethernet communication to secondary controllers; and a modem for Internet connection. The UPS provides ample power to shut down the PC safely.

The Heater Control renders ovens capable of running open loop with a percentage timer or closed-loop using thermocouple feedback. Closed loop programming maintains heater temperature accuracy to within +/- 2 deg. F (+/- 1.11 deg. C), with most heater types. Ovens turn on sequentially to minimize power consumption during startup and feature global



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setting to compensate for ambient temperature and line speed. Tuning heaters with relays through an **auto-tune** program maximizes heater life, consistency, and warm-up times.

The Operator Interface uses non-proprietary National Instruments Lookout software. **Menu-based color displays** provide ease of navigation and machine control throughout the HMI. An extensive diagnostics view of the servo motion controller system aids in machine troubleshooting. Trending capabilities can be used to monitor key process statistics. Historical data is stored and available for offline analysis. Password protection prohibits access by unauthorized personnel.

The oven menu has scaled dimensions of the actual oven. This allows the operator to set up precise zone profiles relative to sheet position displayed on the screen. **Color-coded** alarms, warnings, and other operating information are displayed on a priority basis. Virtually unlimited recipe storage enables an operator to recall previous machinery settings, thus reducing tool-change time.

Level 2 Cut Sheet Control Systems have the **same** open architecture non-proprietary design concept as the Series 4.0 Continuous Control Systems utilizing an industrial supervisory PC to communicate to the discrete controllers. All of the features of menu-based color displays, recipe storage, diagnostics, password protection, modem and UPS are incorporated.

All process parameters for the platen movements, rotate and lift table functions are communicated through the PLC and variable frequency drives. This arrangements provides for **precise timing** of all forming functions and control of movements with acceleration, speed and deceleration variables. Open loop platen systems through the variable frequency motor and drives are **repeatable** within +/- .030", and an optional closed loop system utilizing Allen Bradley Control Logics™ software is **repeatable** within +/- .005".



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Heater controls are assigned through the HMI and are open loop percentage time controlled. Each zone can be set in 1% increments (0-100) of a two second time base. Heater control can be through either a **solid state relays** or **Heater Control Modules (HCM)** with all heater profiles stored as part of the process recipes.

Solid state relay control simply provides the on/off switching device to the heaters where the HCM provides **advanced diagnostic features**. The HCM continuously checks the zones for heater function and normal operation failure. If a fault is detected, an error message is displayed on the monitor. The oven screen will display the actual location of the failure and type of failure detected.

Time-based machine programs allows for unlimited forming routines, which are restricted only by movement capabilities of the machine. Existing programs can be used as templates for new parts by recalling, editing, and renaming.

Brown Machine at NPE 2006

Brown Machine will be exhibiting at NPE 2006 at McCormick Place in Chicago, IL, June 19-23, 2006 at booth #S1409 and can answer your specific questions regarding the benefits of operating with open architecture machine controls.

On Brown Machine LLC

As a global leader of thermoforming technologies, Brown Machine LLC engineers and builds a complete standard line of continuous and cut-sheet thermoforming equipment and related tooling/peripheral equipment. Specialty thermoforming systems suited to a wide range of markets (including automotive, recreational, packaging, appliance and various other industrial segments) can be custom built to exact customer specifications. Brown Machine fully supports the thermoforming industry (Brown machine owners and competitive models, as well) with a full complement of 24/7/365 on-call service and parts support.

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