DL06 PLC puts heaters to the test

By Tom Brickey & Mike Sabatine
Pyromatics Automation Systems
www.pyromaticsllc.com

Pyromatics Automation Systems of Crystal Lake, IL, was contracted by Durex Industries of Cary, IL, to develop a Life Cycle Test Station for its electric heating elements. After extensive research, Pyromatics chose AutomationDirect as the primary supplier of hardware and software for the project.

This test station needed a user-friendly graphical interface to give operators the ability to select multiple ramp/soak parameters, output voltages, temperature sensor types, amperage ratings and total cycle counts on tests for the cast-in electric heater platens. The system also needed to record temperature, volts, and current draw throughout the test for use in quality reports.

Most important, a failure of the heater being tested required a safe shutdown of the test while alerting the quality department of the alarm condition. If a heater is drawing either too much or too little current, or if the temperature difference between the primary and secondary temperature sensor is too large, the system would stop the ramp/soak cycle and turn off the output to the heater.

Pyromatics selected the cost-effective ***Direct***LOGIC® DL06 PLC as the heart of the system because of its ability to control up to eight PID loops and multiple expansion slots available for thermocouple cards and analog input modules. It also provided the necessary discrete inputs and outputs to control two heaters, two chillers and an array of panel indicators, buttons, switches and relays. Programming the DL06 was a snap, using the ***Direct***SOFT® Ladder Logic Editor.

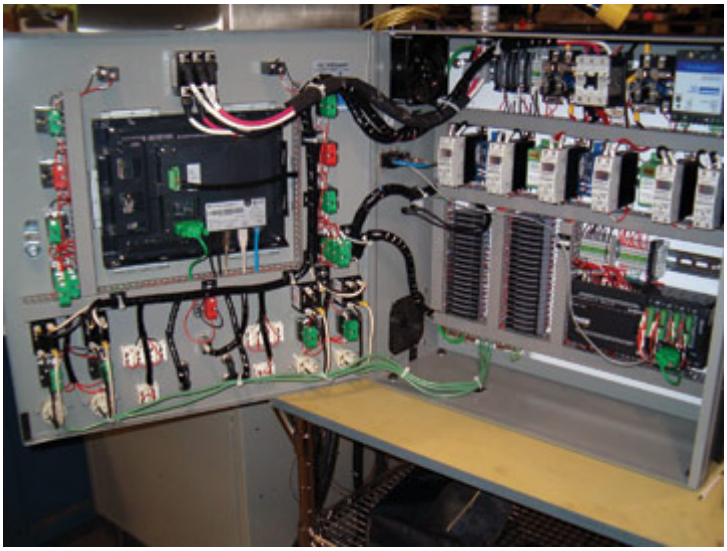
The ***C-more*** EA7-T10C 10-inch TFT touch-screen operator interface was used to provide operators with the necessary interface to operate and monitor the tests.

The challenges of building the control panel were eased with the use of DIN-rail mounted hardware, including the DL06 PLC, terminal blocks, solid state relays, power supply and other components. Wire routing was simplified using T1E Series thin finger wire duct, giving the finished panel a professional look.

The completed system allows users to quickly connect the heater to be tested, enter test

parameters, and run the test. Trend charts on the ***C-more*** panel provide excellent tools for tracking test parameters and quickly identifying potential issues such as sudden drops in current or temperature.

Alarm reporting and history are also automatically recorded, allowing the operator to determine causes of failure. Data from the test can be easily uploaded to a USB thumb drive from the ***C-more*** panel. The data can then be imported into the user's choice of word processor or spreadsheet.



Once the test station was built and delivered, requests for additional analog input requirements were easily met with the extra expansion slots available on the DL06 PLC. Another post-delivery enhancement was the addition of e-mail alerts, sent from the ***C-more*** panel to notify personnel of failures and other events. A duplicate system was built to meet the increasing demand for customer-specified life cycle testing.

Future enhancements of the test stations will include post-cycle quality metrics, such as AC hipot testing, which will verify sufficient insulation of the components to protect operators from electrical shock. AC leakage and heater resistance measurements will also be added.

AutomationDirect provided superior sales and service support throughout the project. Phone and email support and online manuals with detailed example connectivity diagrams and ladder logic samples made any programming challenges achievable.

Both systems have been running on a continuous basis for the past year and have completed full accelerated life testing on over 100 heaters. This testing has allowed Durex to design heaters that meet or exceed their customers' requirements.