

Control Problems Shattered in Glass Coating Process

The Applied Films Corporation "Venture 5000" vacuum coating machine is used to coat glass with silicon dioxide and Indium/Tin/Oxide (ITO). This coated glass is then sold to companies around the world that manufacture liquid crystal displays. These liquid crystal displays are used in cell phones, calculators, game machines, computers and a variety of other displays. The control system on the Venture 5000 coating equipment uses a SoftPLC in conjunction with Allen-Bradley 1771 series I/O. This PLC is then connected via Ethernet to a computerized control console that uses touch screen input to control the machine and computer monitors to provide all instrumentation displays such as pressures, gas flows, and transport drive speeds.



The "Venture 5000" employs trays loaded with rectangular panes of glass, called lites, that are transported at precisely controlled speeds through a plasma created with magnetron cathodes. These cathodes use a process called sputtering to place an extremely thin coating onto the glass. Gas pressures and flows are controlled precisely by PID equations in the SoftPLC. The SoftPLC also controls the motor speeds and the power supplied to the cathodes. The power supplies are manipulated via a serial interface using SoftPLC's TOPDOC Loadable Instructions (TLIs) which were custom created by Applied Films Corporation to interface with Advanced Energy Inc. power supplies. On versions of the Venture 5000 that use cryogenic pumping, the pumping system is also controlled via serial communication with another custom set of instructions.

Applied Films chose to move to SoftPLC for several reasons. There is an obvious cost advantage to SoftPLC over programmable controllers of similar power. SoftPLC was a comfortable fit for Applied Films because of our experience with ladder logic, and particularly Allen-Bradley style ladder logic. It also allowed us to continue using the I/O equipment we are familiar with. The major reason for the switch was the tremendous power and flexibility offered by the TLI's. We were able to craft instructions that exactly met our needs for serial communications and complex mathematics. Price, familiarity, POWER!





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