Laurell Technologies - ø150mm Spin Coater / WS-650-23 System Specifications

Process Controller: The 650-series process controller utilizes a robust microprocessor and with the use of its accompanying PC software (written in an object-oriented programming language) it achieves nearly unheard of flexibility both in process definition and use. This controller allows operator interaction in real-time during the process execution including pausing time, stopping and continuing on from that point. The system can and will be continually be updated easily and quickly in the field with downloadable firmware revisions.

Researchers worldwide have developed unique processes which will ONLY run with the level of control sophistication Laurell Technologies offer. The 650-series controller can also be used in conjunction with a PC with Spin 3000, Laurell's exclusive process management software. However, this is NOT required to program or run the equipment. The use of a PC adds the ability to record a process as it's run, operate remotely, program or communicate across a LAN or the Internet. The software, which is supplied at no additional cost, allows the operator to create virtual process simulations even beyond the hardware actually installed spin processor, in effect, letting them try it before they commit to a purchase. All 650 systems can be upgraded or re-purposed without return to the factory with simple plug-in modules, either actually or virtually, and can contain a virtually unlimited number processes and steps.

A Brief Description: The housing for this system is typically made from a solid co-polymer blend *exclusive to Laurell Technologies*. Unlike pure Natural Polypropylene, this material is able to resist solvents and strong acids and bases. Samples are available for testing and verification upon request. A solid PTFE Hostaflon® TFM-1600 / Teflon® AF housing is available (popular for high temperature chemistry and sub-micron particle studies). Laurell's unique internal bowl design eliminates splash back, making it unnecessary to install "splash rings." Laurell Technologies large down-flow Exhausted Drain Adapter with removable reservoir is as functional as it is convenient. The closed bowl design, coupled with the precision of the process controller, allows most coating materials to dry in a quiescent state, increasing uniformity and minimizing particle contamination. The upper plenum closes inside the base to provide an

overlapping seal, and the inside of the lid has a special gutter to channel fluid to the rear of the system to discourage chemicals from accidentally dripping onto the substrate.

A proprietary labyrinth seal protects the motor and control electronics from chemical contamination. This seal provides the process chamber with Nitrogen purge and has been proven to be particle-free on a sub-micron level during field testing. The system's clear top is made from ECTFE (unless otherwise stated), and only ECTFE-coated 316 stainless steel screws are used in some non-wetted areas throughout the system.

650 Series Controller

Truly Unique Interactive Process Control (NOT a cheap, limited-capability PLC):

- You may now interact freely with the process or allow process inputs to direct actions in a pre-determined way.
- Rotate forward, reverse, or agitate back & forth (cyclically changing direction (programmed in cycles per minute)
- Step backward and forward within a running program
- Loop a sequence of instructions either waiting for an external input or just repeat a step 255 times before continuing
- Change speed or acceleration rate on the fly — while running in edit mode
- Virtually unlimited number of programs with included PC interface software.
- Actual process, chemical, sensor names are displayed, not cryptic numbers, letters or symbols.
- Clear messages for alarms, failures, and deficiencies indicating what is wrong
- Each program step can be conditionally interlocked with multi-directed action
- Step forward, backwards, pause, stop or start at any point of your process
- Digital inputs (read and direct process based on: end-point detection, resistivity, temperature, pressure, level sensors, exhaust flow, safety interlocks, et al.)
- Digital outputs (control valves, mixers, dampers, alarms including light trees, et al.)
- *Acceleration / Deceleration (programmable in each step with 1 RPM/second increments)
- Speeds as slow as 1 RPM or as high as *12,000 RPM

Standard Features Include:

- Digital readout of closed loop speed control
- Non-Volatile memory
- Convenient twenty, 51-step program storage (can be rearranged in the field to a maximum of 128 programs with 8 steps each, and a minimum of 5 programs with 255 steps each, if desired)
- Vacuum and lid interlocks — display of actual vacuum at the wafer (will not allow rotation if hold-down force is insufficient) the set point is user adjustable
- Step time from 1 second to 99 minutes 59.9 seconds in 0.1 second increments
- Design precludes accidentally re-running a process on the same wafer
- Password-protected (lock programs, assign different levels access)
- Standard communications port for PC software included

Operation:

Familiar keypad —function-oriented interface panel and graphic back-lighted information display make the learning curve just a few minutes to program and use.

*may be restricted to lower speed or acceleration rate based upon substrate size, weight or chuck type