

Automation Software Tools from Precision Process Equipment



Precision Process Equipment not only designs and builds custom processing equipment, but we also provide software tools to run and optimize your system processes. The Automotion Suite provides industry and machine-specific interfaces for wet-process equipment, including electroplating, anodizing, and cleaning systems.

The Automotion Suite is a 32-bit software application designed to harness the full power of Windows™. The suite is compatible with NT based versions of Windows, including 2000 and XP. The system controls and monitors automatic hoist systems (rack and barrel processing), reel-to-reel (R2R) plating lines (stampings, connectors, etc.), wide web plating systems (coil, strip material), and wire cleaning/plating lines.

Automated wet process control systems can be configured with built-in touch screen controls mounted directly on the machining equipment. Monitors can be mounted to the machine frame, or mounted to swivel-type arms for easy viewing.

Remote consoles are available, to house the computer and monitor. Consoles may be configured as "stands", typically located adjacent to load/unload areas. Or, they can include a complete table with printer stand and work area for analysis and reporting.

Robust reporting tools for your electroplating processes include:

- Historical trending
- Batch reporting
- Event logging
- Third party SPC compatibility
- Open database formats (Access, SQL Server, Oracle, ODBC)
- Control systems

Control systems features

- PLC or PC control
- OPC Interface
- Allen-Bradley, Omron, Mitsubishi, Siemens, etc.
- Motion control: 2-3 axis robots and hoists
- Random-loading, dynamic hoist scheduler
- PC version and PLC version of hoist scheduler
- HMI integrated or stand-alone
- MaxRacks Rack and Barrel Line Simulator
- Custom screens for industry and business specific needs
- Process control
- SCADA
- Native Windows or FactoryTalk versions of HMI
- OPC servers for select rectifier, instrumentation, and I/O manufacturers
- Historical Trending
- SPC integration

Other features include

- Part database tailored for customer's business
- Recipe creation and management software
- Customization options for the end user
- Microsoft Windows platform compatibility

- Network support
- Remote Service and support integration

Changes and Access Permission

The Automotion Suite allows changes, including additions or deletions of process equipment, such as pumps, heaters, and level controls, to the software program.

A security system with multiple password levels allows management to maintain strict control over control systems operation, including process sequences and times, temperature set points, rectifier set points, activating pumps, etc.

A main menu provides a beginning navigation point to line monitoring and setting screens.

Programmable Recipes and Part Information

The Automotion Suite uses the customer's part numbers and required process information to establish a "recipe." A part number's recipe contains all information required to process the part through the wet process system. This includes operating parameters such as dwell times in the tanks, required temperatures, rectifier settings, filtration, pH, etc.

The software is capable of storing thousands of part numbers and their corresponding recipes. Once recipes have been established for a given group of parts, processing them through the control system software is as easy as clicking a button. Automotion features simple pull-down menus and buttons allow the part to be selected. All stored cycle data is then uploaded into the processing sequence. The operator then places the load of parts into the wet process system, and the automated hoist system will take over.

New parts can be added at any time to the control systems software. Automotion allows easy creation of parts, even while other unrelated parts are being processed through the equipment. Referred to as "Building a Load," the operator simply enters part and load information on a single screen. Establishing parameters for each tank in the line is a snap. Pre-programmed station names in pull-down menus, along with a set of buttons for each tank, allow the software operator to establish minimum and maximum dwell times, drip times above the tanks, and which step in the cycle the tank is to be used.

The MaxRacks Software Application

One of the most difficult tasks for a line supervisor is to increase the efficiency of wet process equipment. The Automotion Suite offers a stand-alone software application, entitled MaxRacks, that can be provided to help establish the most effective process cycle. The software program allows "What if?" scenarios, letting the user change tank positions, number of tanks, number of hoists, and tank dwell times to find the greatest production rate achievable.

A tremendous advantage to using MaxRacks software is its graphical representation of the wet process system. Processing of loads can be displayed in simulated accelerated time, allowing the user to easily identify potential bottlenecks. Color coding of tanks and tank numbering allow simple set-up and "follow along" as the software simulates the production of parts through the system.

Establishing An Efficient Process Tank Cycle With The Automotion Suite

After MaxRacks is used to establish an efficient process tank cycle, the generated recipe parameters can be imported to the Automotion Control Software to replicate the results on production equipment.

Automotion Suite Maintenance Tasks

The Automotion Suite can also be configured to help with maintenance tasks. For instance, each flight bar, rack, or barrel can be assigned a number within the software, and its usage tracked. They may be

assigned a predetermined number of uses before scheduled maintenance is to be performed. This allows off-line operations such as rack stripping, checking the electrical contact points, and tightening of screws. By setting up such a system, the operator can be alerted when a rack should be taken out of service.

Other control systems software maintenance tasks crucial to the operation of the equipment can be aided through the Automotion Suite.

Chemical replenishment can be automated through the use of metering pumps or other similar means. The software can track chemical usage based on a number of criteria, such as amount of parts processed (square feet or centimeters), pH, conductivity, or other means.

Software options are available for simple "operator alerts", stating that it is time to make a manual replenishment (from a drum, for example). A typical example would be based upon pH.

Automatic additions of predetermined amounts of chemical can be controlled and monitored. A typical example might be based on conductivity.

Automation Features - Build Load

The Automotion Suite software allows processing of individual loads that are easily tracked through the "Build Load" section. The software can be configured to allow the tracking of flight bars, racks and/or barrels, loads, groups of lots, and individual lots of parts.

Each flight bar, rack, and/or barrel is assigned a unique number, allowing it to be tracked by the software. Whenever a flight bar (or rack or barrel) is used in the line, the parts placed on it are assigned a unique run number. The control systems software offers the ability to assign a customer work order for the load. This allows a specific work order, consisting of a "lot" of parts, to be traced to a specific rack.

The software operator can also enter his name and badge number (optional). This can be typed manually, or automatically entered through an optional bar code system. The software operator who processed the load will then be traced to the specific parts processed. The sequence used for the load is also chosen from a drop-down menu.

Separate "lots" of parts can be processed and tracked in the same load. In the above example, up to live separate parts can be processed, all with complete traceability.

Automation Features - General Status Screen

During operation of the equipment, all parameters defined in the recipe can be monitored at the HMI screen. A "General Status" screen allows the software operator to see the primary components of the machine, and their current status. Components are color coded, allowing the software operator to quickly see problem areas. A process cycle status area near the bottom of the screen lists current flight bars (racks, barrels, etc.) in process. Their location, current status, time left, part numbers, lot numbers and other vital statistics are also listed on the status screen.

The ability to "drill down" to the individual tank level is included. This allows the software operator to compare component status with set points, and to ensure that everything is operating correctly.

Automation Features - Alarm Status Screen

Automation Suite Software displays an alarm whenever a problem occurs with the equipment or process (given the component has an interface with the PLC or PC). Automation Suite has an "Alarm Status" screen that displays a list of alarms that have occurred, such as over-temperature, high rectifier current, etc. Color-coding differentiates new and old alarms.

When an alarm is initiated, the "Alarm Status Screen" immediately pops up on the software operator's screen, on top of any other screen that is currently on display of the Automation HMI. The operator cannot leave the "Alarm Status Screen" until the specific alarm has been acknowledged. Once acknowledged, the color of the alarm description changes from red to green. The alarm description is not removed from the screen until the problem itself has been corrected.

Automation Features - Troubleshooting

As an aid to general troubleshooting and resolving alarm conditions, a separate group of screens is available for inputs and outputs. Automation Suite displays this "I/O Status" screen. This screen shows the current state of all I/O.

Tagnames, such as "I-LOLEV07" represent a point on the I/O rack. Tagnames and physical I/O can be matched by comparing wire numbers within Automation.

A description of the point may be obtained by clicking the tagname in Automation . The description appears in the Status Bar of the software. In the example of "I-LOLEV07", the description may be displayed as "Low Level Station 7".

For more details on our software and automation systems please contact us.

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