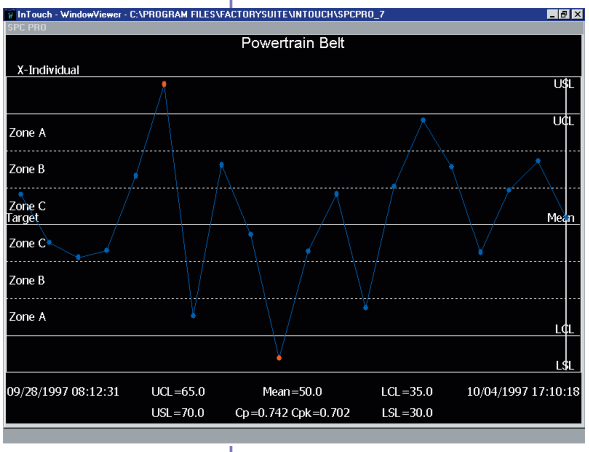
On-Line Quality Monitoring and Control Software

SPCPro

Product Position



SPCPro is the on-line Statistical Process Control analysis module of FactorySuite™ 2000. Used to monitor and analyze quality data to improve product and process quality, reduce rework and defects, SPCPro extends the power of FactorySuite 2000 by providing proven analytical tools. It is a highly effective complement to your quality improvement initiative.

Designed to provide on-line process quality monitoring using numerical methods, SPCPro provides real-time triggering of alarms for rule violations. Immediate process feedback enables quicker response and more effective corrective actions. SPCPro also provides open access to its data for additional post-process analysis or reporting.

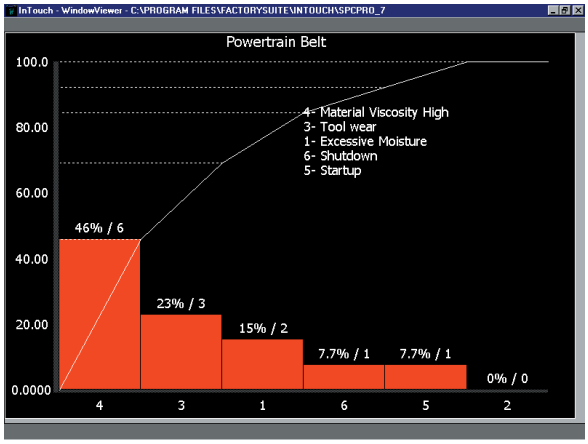
SPCPro provides the benefits of statistical process control without needing any formal knowledge of statistics. Highly graphical tools for chart and data display, alarm acknowledgement, and dataset configuration make SPCPro easy to use and configure.

Applications

Combining both short-run and long-run SPC capabilities, SPCPro is ideal for discrete and continuous process manufacturing. SPCPro helps users to understand their processes and to make more informed quality-related decisions.

SPCPro collects measurement data from plant devices, performs statistical calculations, and displays that data graphically on its control charts. SPC data is stored in an open relational database for easy access and documentation.

SPCPro then generates alarms based on run-rule violations such as 'sample outside of control limits' or 'X successive samples in one direction.' Operators can react to those alarms by investigating and addressing the cause of those alarms. Operators can acknowledge those alarms, assign special causes, and perform corrective actions such as adjusting equipment, materials, process, or other activities that help improve the quality of the process and consequently of the product.



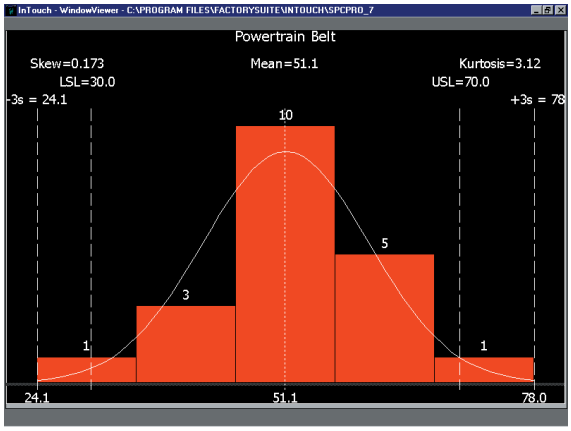
Engineers can further analyze the SPC data to make improvements in the process. Special causes can then be displayed in the pareto charts, thereby helping to identify the most significant causes of problems. Engineers can apply historical process data from IndustrialSQL Server™ to get a better

Statistical Process Control (SPC)

PRODUCT DATA SHEET

SPCPro is used to monitor and analyze quality data, to improve product and process quality, and reduce rework and defects.

understanding of process behavior. Addressing the largest contributors of quality problems will help to improve quality and yields and to reduce scrap. Histograms display the distribution of the data to help identify how the process is centered and how much it varies. Engineers can glean from histograms and CuSum charts directionally where to adjust the process. SPCPro data can be accessed by complementary analysis tools to further improve the process' capabilities or locate excessive causes of variation.



SPCPro can help answer such common questions as:

Process Capability

- Is my process capable of manufacturing to these specifications?

Defect Analysis

- What are the biggest special cause contributors to product defects?

Process control

- Is my process in control?
- Is my process skewed?
- What areas in my process should I adjust to improve quality?

Features and Benefits

Get a better understanding of your processes. Identify the most significant causes of problems and eliminate them. Reduce scrap and waste. Most importantly, improve your product and process quality. Statistical Process Control, in conjunction with your quality program, can help you achieve these results.

Powerful charts and analysis tools

SPCPro provides powerful charts and analysis tools to help you gain a better understanding of your process.

Control charts:

X individual: plots individual measurements as samples

X bar, R chart: displays the average process center from multiple measurements and the range of measurements (widths) for each sample

X bar, s chart: displays the standard deviation of the measurements for each sample

Moving X, Moving R chart: uses the running average of n samples to display the process center and width

EWMA chart: places more weight to recent samples to detect changes in processes sooner

Cumulative Sum Chart: cumulatively sums the deviation from target to provide sooner detection of process shifts.

Defect charts:

- **P chart:** plots the proportion of nonconforming units from samples of a various size. The value plotted is a percentage of defective items and will range between 0 and 1.
- **Np chart:** plots the number of nonconforming units from samples of a constant size
- **C chart:** plots the total number of defects from samples of constant size where one unit may contain multiple defects
- **U chart:** plots the average number of defects per unit from samples of various sizes where one unit may contain multiple defects.

Other charts:

Histogram:

Histograms display the frequency and distribution of the collected data in the form of a multiple zone bar graph. Histograms provide a graphical way to analyze normality of your data. SPC Pro also provides curve description metrics – kurtosis and skewness.

Pareto chart:

Pareto charts graphically present the number of occurrences of special causes as entered by the operator. The graph indicates the number of occurrences of particular causes and the cumulative percentages of the various causes.

Analysis chart features:

- Configurable zones—from 3 to 6-sigma zones per chart.
- Automatic Control Limit Calculations—control limit calculations can be configured to run automatically.
- Detailed Sample Information including time-stamps, sample and measurement details.
- Notations—Brief annotations can be placed on any sample. These notes will be stored and displayed along with the sample.
- Special causes—An operator can associate a special cause with any sample. These special causes track

the occurrences of the biggest sources of problems. Special causes can be added during run-time and development-time.

- **Flexible Alarming features**—SPCPro provides real-time alarming based on statistical rule violations. There are eleven user-definable run rules (including seven Western Electric rules). Each run rule has an associated alarm and priority. Sample colors change when in alarm state and can be acknowledged on the chart.
  Alarm indication and acknowledgment is made easy. SPCPro uses both the FactorySuite 2000 Alarm Manager and charts to indicate alarm conditions and for alarm acknowledgement.
- **Zone centering**—A visual enhancement called 'zone centering' enables samples to be displayed in the center of its zone, making zone identification easy.
- **Corrective Actions**—Corrective Actions enable operators to record and track actions that were made to correct problems. A Corrective Action symbol is placed on the sample to which those corrections pertain.

Flexible:

SPCPro provides a high degree of utility and ease of use:

- **Configurable displays**—chart location, colors, display properties are all configurable by the user.
- **Multiple data entry modes**—SPCPro accommodates a variety of methods for entering samples.
  - **Automatic time-based collection**—data can be automatically collected cyclically.
  - **Event-based automatic collection**—user-configured events can trigger the collection of data.
  - **Manual data entry**—data can be entered manually via dialog boxes.
- **Ability to modify and delete samples**—all changes have audit trail.
- **Open relational database**—SPCPro data is stored in an open relational database (IndustrialSQL Server, Microsoft® SQL Server™ and Microsoft Access™). Users can review history for further analysis or data exploration. Or use popular ODBC-compliant reporting tools to publish quality reports. Other statistical analysis tools can also be used for further analysis such as experimentation.
- **Scalable**—SPCPro is client/server architecture and is highly scalable, from stand-alone (single machine) implementation to fully-distributed SPC configurations.

Integration With FactorySuite 2000 Components

SPCPro is tightly integrated with other components of FactorySuite 2000.

- InTouch®—SPCPro leverages InTouch's user interface, scripting, rapid development capabilities, and other services such as the alarm manager.
- InBatch™—Used in conjunction with InBatch, SPCPro can provide quality monitoring on a batch or campaign level.
- InTrack™—Used in conjunction with InTrack, SPCPro provides lot level quality monitoring.
- IndustrialSQL Server—SPCPro uses IndustrialSQL Server to store its data.
- SuiteLink—SPCPro acquires from DDE, FastDDE and SuiteLink IO Servers.

Ease of Use

SPCPro is both easy to use and flexible, enabling users to quickly reap its benefits. Charts and objects facilitate easy operation while context-sensitive dialog boxes provide quick configuration.

Connectivity

SPCPro employs Open Database Connectivity to connect to its database. Database options include IndustrialSQL Server, Microsoft SQL Server, and Microsoft Access.

Specifications

Hardware Required:
Client machines: Pentium 133 mhz with 32 M of RAM

Server Machines:
For 10+ datasets: Pentium Pro 200 with 64 M of RAM

Software Required:
InTouch 7.1; Windows NT 4.0 SP5 or Windows 95 or Windows 98 SE; IndustrialSQLServer 7.1, Microsoft SQL Server 7.0 or Microsoft Access 97 or Access 2000

Contact Wonderware or your local Distributor for information about software products for industrial automation.
Wonderware Corporation • 100 Technology Dr. • Irvine, CA • 92618 • Tel: (949) 727-3200 • Fax: (949) 727-3270
www.wonderware.com

PN 15-0016 Rel. 11/99