

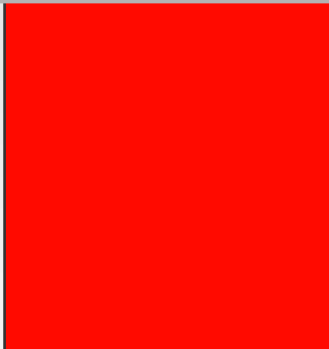


csense[®]

SPC+



In today's competitive environment it is crucial to effectively and consistently hit process specification targets. Due to the many factors that impact processes it is not always easy to track how close a process is to specification or what the expected error rate of the process is. CSense SPC+ can help your company overcome these hurdles. CSense SPC+ can be used by process engineers through to certified Six Sigma users to monitor variability in process operation through the use of Statistical Process Control (SPC) reports and associated key performance indicator (KPI) driver trees to help point to possible causes of poor performing KPIs.



Discover how CSense SPC+ as part of the CSense Process Performance Enhancement solutions offering can assist you in keeping your processes in control and increase your profitability.

benefits

- SPC+ is not only the univariate SPC component of the CSense process performance enhancement offering, but also provides along with Cause+, Process+ and the Troubleshooters an integrated comprehensive process improvement solution
- Identification of worst performing KPIs by visually highlighting them in SPC Reports and Driver Trees, which provides the user with the underlying dependencies and relationships between KPIs and other tags
- KPI Driver Tree reporting displays key SPC statistics and control chart for each KPI and alert users if user-defined statistical thresholds are exceeded. It also helps to identify possible causes for poor performing KPIs by indicating which other KPIs in the same branch of the tree are also behaving poorly
- Summary SPC Reports and KPI Driver Trees can be updated via periodical user-defined schedules to keep the SPC statistics up to date on a regular basis
- Ability to generate Ad hoc summary and detailed reports over a custom period
- Off-line SPC parameter estimation, statistics and visual analysis on historical data within multivariate troubleshooting environment and exporting of SPC configuration into Web-based SPC+ report delivery platform
- Web browser-based configuration and viewing of SPC reports and driver trees
- Users can define their own KPI Driver Tree where the full tree or parts thereof can be published for use by other users
- Email-based delivery of on-line standardized SPC reports
- User-based login with assigned roles (administration, configuration, scheduling, and viewing)
- For each KPI, detailed SPC+ reports cover SPC statistics, count statistics from SPC tests or Western Electric rules, control charts and pre-control charts
- KPIs can be assigned to a section within a user-defined hierarchical tree structure to allow filtering of KPIs for Report viewing and configuration purposes
- Simple to configure and minimal training required



Product overview



CSense SPC+ equips production and manufacturing engineers, production managers or certified Six Sigma users with the ability to do on-line monitoring of the common cause variation and the selective detection of special cause variation in the operation of continuous processes. CSense SPC+ provides production personnel with scheduled or ad hoc reports on the variability in the Key Performance Indicators (KPIs) of continuous processes. Worst performing KPIs can be identified by visually highlighting them in Driver Trees (a hierarchical tree structure that defines the underlying dependencies and relationships of KPIs and other tags) and SPC summary reports. A summary report ranks KPIs from worst to best performing using selected SPC statistics and provides links to the detailed KPI reports. The latter consists of control and pre-control charts, Process Capability (PC) statistics, Process Performance (PP) statistics and SPC tests or Western Electric Rule (WER) counts. Each report covers a sub-selection of KPIs for a fix time period. SPC+ reports are selectively delivered from a web server to authenticated users.

A user can structure the KPI statistics that the SPC+ web server delivers into different sections, putting KPI tags into context. SPC+ also provides the user with user-defined KPI Driver Tree to provide further context for the KPI. Each KPI's performance delivered to a user is earmarked with a weighted score, which takes into consideration the importance of a variable and its PC and PP statistics. If the weighted score of a tree node exceeds certain user-defined thresholds, the associated problematic KPIs are visually highlighted. By clicking on a Driver Tree node, the user can see SPC statistics and X-bar control chart of the associated KPI tag and can also click on the links provided to go to the corresponding summary and detailed KPI reports. Other than the PC and PP statistics, the detailed KPI reports contain X-bar, Range, Sigmoid and CUSUM (Cumulative Sum) control charts for a KPI over a fixed duration, as well as the associated pre-control histogram charts. KPIs, being continuous variables, are sampled at a fixed rate for a fixed number of samples to form one sub-group. Control chart statistics are plotted as a function of the subgroups.

Reports can be requested as ad hoc reports or at scheduled intervals. Each report has a start time and covers a predefined period. Each report covers a number of KPIs and is selectively assigned to web server authenticated users. In combination to the delivery of a report, a user can receive a html based email, covering the PC, PP and WER scores for the KPIs in the report.

CSense SPC+ is a decision support product that consists of off-line and Web-based reporting components. CSense SPC+ makes use of the CSense Wizard environment for data collection, data preparation, data visualization, control limit identification and off-line SPC analysis. For each KPI the user needs to visually select the data that defines its engineering tolerance range (Lower specification limit and Upper specification limit) via rulers or brushing. The software then allows the user to define SPC+ parameters for each tag such as the relative importance (weight), subgroup period and estimated means and sigmas, and can also provide the user with parameter estimations (estimated sigma, means and sigmas for X-bar, Ranges, and Sigmas control charts) for the selected data and engineering tolerance range. The user can then view the pre-control histogram, SPC statistics and control charts for each KPI tag on all brushed or non-brushed data. The SPC+ Wizard within the CSense Troubleshooter then provides users with the means to export the related KPI tag and its SPC parameters as an Extensible Mark-Up Language (XML) file for deployment on the SPC+ web server.

CSense SPC+ Components



CSense SPC+ Functionality

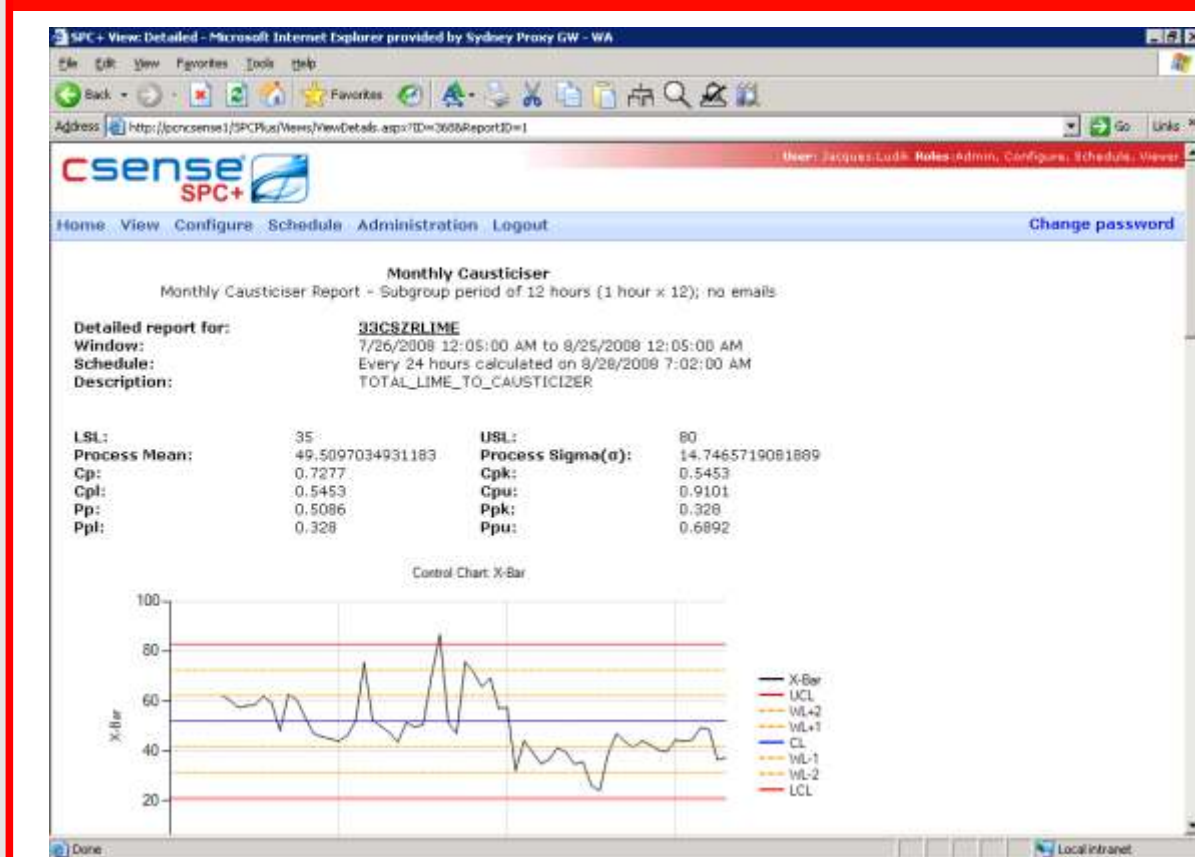
CSense SPC+ has two main components: the off-line component and the web-based reporting component. In order to access the CSense SPC+ Wizard off-line component, the user needs to open the CSense Continuous Wizard application. The user can then start with the typical problem definition step for data collection, variable classification and data visualization and analysis. Once the data is imported and properly prepared, the user can access the off-line CSense SPC+ component for data selection of acceptable process conditions for the SPC parameter estimation, SPC analysis of the selected and unselected data, and exporting SPC parameter configuration for import into the SPC+ web server.

The SPC+ web server provides the user with configuration and SPC report viewing capabilities that include KPI Driver trees, Summary and Detailed KPI Reports. These reports deliver SPC control charts and SPC statistics for each KPI to authenticated users, which can have a combination of roles that include viewing, configuration, scheduling, and administration. KPI tags can be assigned to a section within a user-defined hierarchical tree structure to allow filtering of KPIs for Report viewing and configuration purposes. Reports are constructed from a report template. The web server allows for the delivery of an email to a user with the delivery of each report. Problem KPIs are highlighted based on their CP-, PP statistics and WER count statistics.

CSense SPC+ Off-line Features

- Data collection and preparation via CSense SPC+ Wizard
- Data visualization and visual data selection for SPC configuration and analysis purpose
- Continuous KPIs are sampled into subgroups, at a fixed rate, for a fixed number of samples
- Parameter estimations according to engineering tolerance range for each KPI
- Calculation of SPC statistics, WER rule counts and control charts on all brushed and non-brushed historical data
- X-bar, Range, Sigmoid, and CUSUM (Cumulative Sum) control charts and histogram pre-control charts for each KPI tag

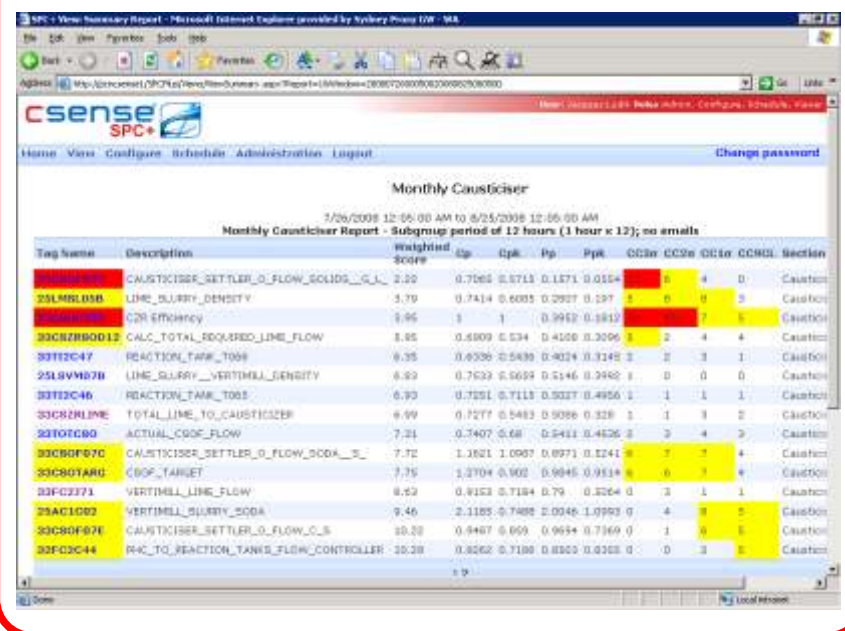
Part of detailed SPC Report showing SPC statistics and X-bar Control chart for a KPI



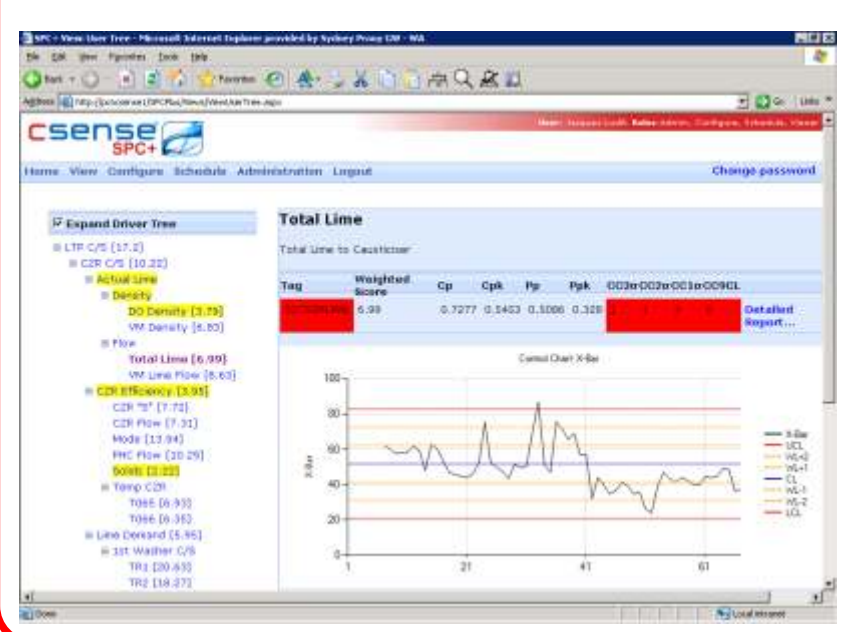
CSense SPC+ Web Server and Reporting Features

- Web-based configuration of Sections, KPI tags, Reports, Reporting Schedules, KPI Driver Tree Schedules, KPI Driver Tree, and Emails
- KPI Driver Tree displays key SPC statistics and control chart for each node and alerts users if the weighted score (that takes into consideration the importance of a variable and its SPC statistics) for the node exceeds certain thresholds
- Users can define their own KPI Driver Tree where the full tree or parts thereof can be published for use by other users
- Summary SPC Reports and KPI Driver Trees can be updated via periodical user-defined schedules to keep the SPC statistics up to date on a regular basis
- Identification of worst performing KPIs by visually highlighting them in Summary Reports
- Ability to generate ad hoc summary and detailed reports over a custom period
- Detailed KPI Reports cover SPC statistics (Pp, Cp, Ppk, Cpk, Cpl, Cpu, Ppl, Ppu), count statistics from SPC tests or Western Electric rules, control charts (X-bar, Range, Sigmoid, CUSUM) and pre-control charts such as histograms.
- Email-based delivery of on-line standardized SPC reports
- User-based login with assigned roles (administration, configuration, scheduling and viewing)

Part of Summary SPC Report showing worst performing KPIs at the top and highlighting certain KPIs that exceeds thresholds on the Western Electric Rule Counts



KPI Driver Tree with SPC statistics and X-bar control chart for selected node and highlighting certain nodes in the tree that exceed weighted score thresholds



When to use CSense SPC+

CSense SPC+ can be used to monitor the variability in KPIs such as throughput, yield, quality, and product grade to determine the extent and the source of deviations from process specification. It identifies worst performing KPIs from a univariate SPC perspective and with its KPI Driver Trees also helps to highlight possible causes for poor performing KPIs. CSense SPC+ complements and combines well with the CSense Troubleshooters, CSense Cause+ and CSense Process+ to help enhance process performance.



About CSense Systems

CSense Systems was established in 1997 and is a rapidly growing company with a global partner network of highly professional industrial software distribution and engineering companies with deep domain skills. Apart from software products, it also offers Process Performance Enhancement services and global solution support. CSense software facilitates a 7-step troubleshooting methodology which makes it easy to determine causes of process problems rapidly and fast-tracking process improvement actions leading to operational excellence and growth.

CSense. Enhancing Process Performance.



CSense Systems

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