

Introduction

QC-CALC Real-Time is used to collect and display measurement results from all CMMs, Video CMMs, and hand gages without operator intervention. Reports can be created and data can be exported to spreadsheets, databases, and other SPC programs. This means you can transfer data from all of your measurement devices to any SPC package using one program!

Our goal is to make data collection seamless regardless of the equipment purchased or software used.

Key Benefits

- Fully automatic data collection from over 200 types of machines
- View up to 1200 live plots (dimensions) while collecting data for many more
- Manual and automatic export capability to over 40 different output formats
- Manual and automatic report generation
- 21 CFR Part 11 compliance
- Trend detection with email alerts
- Dynamic filtering of dimensions
- Multiple gage output combined into one screen (MultiSource)
- True Position Charting with 2D position charts
- Flexible plots support I&MR, XBar & Range, Scatter, Whisker, and True Position Plots

QC-GAGE

ZEISS

QC-PLC

RAM Optical Instrumentation

gpc

FARO

TESA

HEXAGON METROLOGY

pcodmis

RENISHAW

Mahr

Nikon

Sheffield

Mitutoyo

QC-CALC SPC

Office Buddy

ERS Enterprise Report Scheduler

Minitab QUALITY. ANALYSIS. RESULTS.

jmp Statistical Discovery From SAS

WINSPC STATISTICAL PROCESS CONTROL

Microsoft Excel

MeasurLink

Reaction Plan Manager

Q-DAS

statgraphics centurion

Microsoft SQL Server

XML

ASCII, CSV

Pinpoint On-Screen Information

The plots are interactive and can be interrogated for information and statistics using the mouse to target specific or multiple points.

Trend Analysis

The process can be monitored and reports automatically triggered as trends in the data occur. Operators can then be forced to assign causes and corrective actions.

Quick Stats

Calculations are updated in the Quick Stats panel instantly as points are highlighted and as the mouse moves from plot to plot.

Exporting

Data can be exported either manually or automatically by part interval to over 40 different output formats.

Reporting

Reports can be printed either manually or automatically by part interval or by exception event. Reports can be printed to the printer, preview, or any of several output file formats such as PDF. Reports can also easily be attached to emails allowing QC-CALC to notify appropriate personnel when the process moves outside control, specification, or configurable limits.

Manual Input Screen

In addition to data collected from automatic inspection equipment, QC-CALC can prompt inspectors for additional measurements or trace data not available from the gage.

Assignable Causes

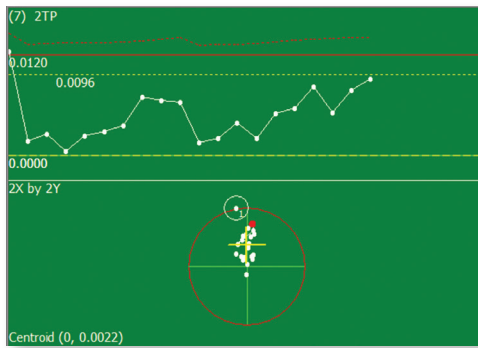
Indicate assignable cause variance by right-clicking on the plots and assigning a cause to your part.

Record Filtering

Quickly display and report on the data needed at the moment. Dynamic record filtering allows the filter to change automatically based on the part or user input just received.

Live True Position Charts

Relationships can be created between the X, Y, Diameter, and True Position data coming from the inspection equipment to create a stacked true position plot. This unique chart depicts the true position with calculated MMC bonus in the top half and the 2D position relative to specification limits in the bottom half. The Cpk and centroid are also calculated and displayed for informational purposes.



Gage R&R Wizard

Inspection data is useless without first proving the reliability of the measurement system being used. A Gage Repeatability and Reproducibility (GR&R) study doesn't have to be a painful process. QC-CALC's Gage R&R Wizard guides users through the setup process, warns of potential problems, and analyzes the results via customizable reports.

Gage R&R Anova using Percent of Spec Limits January 16, 2009 9:40:27 p

Prolink
 Gage Type: CMM Large Blue machine
 Gage Size: 12x12x24
 Gage Number: 432
 Performed by: Bill and Bob
 Record Range: 1 - 90
 Parts: 10
 Trials: 3
 Operators: 3
 Total Records: 90

Part Variation (PV)
 Part Variation is a measure of how much the process is actually varying. If an infinite number of parts made by this process were measured using an ideal Gage, 50 DV (51.15 approx) of the parts would be within an Internal Part Variation value. This is, of course, only an estimate.

Gage Variation (GV)
 Gage Variation is a measure of the combined variation of repeatability and reproducibility caused by the gaging system as reported to the manufacturing process. This number, expressed as a percentage of tolerance, is the most important "warning flag" if it is a large percentage of total variation but not a large percentage of tolerance. Both the gage and the process are good and the process standard deviation is even smaller than it appears (meaning the process spread is smaller and Cpk larger than reported). This also means a more precise gage would allow tighter control limits for earlier detection of loss of control. The following table shows typical interpretations.

Repeatability (RV)
 Repeatability is a measure of how much the gage readings vary when the same operator measures the same part several times. It is a large value might indicate gage wear, improper measurement policy, but all operators are making the same "mistake." It is not a matter of individual operator skill, or a gage without sufficient resolution or with a defect. This number is best used by comparing it with reproducibility.

Reproducibility (RP)
 Reproducibility is a measure of how much the gage readings vary when different operators measure the same part several times. It is a large value might indicate gage wear, improper measurement policy, but all operators are making the same "mistake." It is not a matter of individual operator skill, or a gage without sufficient resolution or with a defect. This number is best used by comparing it with reproducibility.

Interpretation:
 Gage is sensitive. May be acceptable based on importance of the measured part, cost of gage.

% of Tol:
 0 - 10%: Good
 10 - 30%: May be acceptable based on importance of the measured part, cost of gage

Gage R & R (Range) Report January 16, 2009 2:07:34 p

Dimension	Part No. & Name	Sample Gage R&R, GR&R, GRR	Dist. From	CMM Large Blue machine	Repeatability (RV)	Reproducibility (RP)
1	Circle diameter	0.0000000	0.0000000	0.0000000	0.00%	0.00%
2	Circle X	0.0000000	0.0000000	0.0000000	0.00%	0.00%
3	Circle Y	0.0000000	0.0000000	0.0000000	0.00%	0.00%
4	Left Edge Width	0.0000000	0.0000000	0.0000000	0.00%	0.00%
5	Right Diameter	0.0000000	0.0000000	0.0000000	0.00%	0.00%
6	Feature Locator X	0.0000000	0.0000000	0.0000000	0.00%	0.00%
7	Feature Locator Y	0.0000000	0.0000000	0.0000000	0.00%	0.00%
8	Face	0.0000000	0.0000000	0.0000000	0.00%	0.00%

Measurement Unit Analysis % Total Variation (TV)

Repeatability - Equipment Variation (EV)	Reproducibility - Appraiser Variation (AV)	Repeatability & Reproducibility (GRR)	Part Variation (PV)
$EV = \bar{R} - K_1$ = 0.00010116	$AV = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (R_i - \bar{R})^2} + (R_1 - \bar{R})^2$ = 0.00002286	$GRR = \sqrt{EV^2 + AV^2}$ = 0.00010371	$PV = R_p - K_2$ = 0.00010371

% of Spec

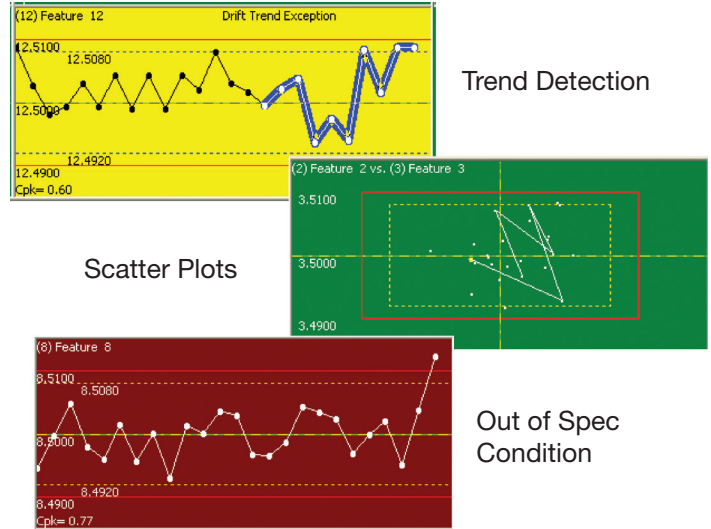
EV	AV	GRR	PV
82.33%	1.34%	84.66%	82.33%
= 506% of Spec	= 1.34% of Spec	= 5.10% of Spec	= 103% of Spec

Used in this Report

Dimension Filtering

Reduce on-screen clutter to quickly identify only the most critical features.

Plot Types



Trace Fields

A maximum of 60 additional trace fields can be captured in addition to the measurement data. This allows for more granular filtering when problems occur.

21 CFR Part 11

The control of inspection information as it applies to the medical industry is defined by FDA title 21 Code of Federal Regulations (21 CFR Part 11). QC-CALC's data collection, storage, and reporting adhere to this important standard. This option can be disabled for industries not requiring such strict control.

Data Integrity Report Printed on January 27, 2009

Prolink
 SamplePart.COC

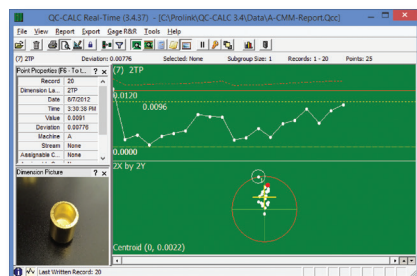
The report lists all changes made to the raw QC-CALC file containing inspection data. All changes are documented and include the record number, user, and reason the change occurred.

If you desire a report for a specific part, serial number, or other condition, please create a record filter to reduce this report. For example, you can create a date filter to see all changes made for a particular day or range of days. Likewise, you can search for a particular serial number and create a report for one part. See filtering data for more details.

Rec	Date Performed	Action Performed	Feature or Document Location	Old Value or Action ID	New Value	User	Reason
4	12/12/2008 1:25:28 PM	Dimension 1	Feature 1	1.4986	1.5000	Bruce	Bad measurement
9	12/17/2008 1:29:01 PM	NumFactor 1	Cavity	1	2	Bruce	Remeasured Part
14	12/31/2008 1:30:45 PM	Dimension 1	Feature 1	1.4973	1.5100	Bruce	Dirty Part
22	1/2/2009 1:32:02 PM	Dimension 5	Feature 5	5.4976	5.4900	Jon	Bad measurement
48	1/27/2009 1:32:39 PM	Dimension 5	Feature 5	5.4983	5.4900	Jon	Broken Gage

Add Pictures to Each Dimension

A picture can be added to each feature to give more meaning to the plot data.



Please download a 30-day trial version from our website and try it out!

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