ProQMS-Xtra User Manual

1 Overview of ProQMS-Xtra

1.1 Quality Management with ProQMS-Xtra:

ProQMS-Xtra is an extremely powerful tool for implementing the Quality Assurance Plans in the manufacturing industry where typically physical dimensions of the product could be the parameters of quality.

ProQMS-Xtra helps in the implementation of quality plans during the manufacturing process as opposed to traditional methods where quality testing is done after completion of the process. The former ensures that failures can be detected at the respective stages of the process, and that monitoring of quality at each stage of the entire manufacturing process contributes to the reduction of the cost at early stages.

The following ISO 9001:2008 clauses form the backbone for **ProQMS-Xtra**:

Control of production and service provision (7.5.1)
Validation of processes for production and service provision (7.5.2)
Monitoring and measurement of product (8.2.4)
Control of nonconforming product (8.3)
Corrective action (8.5.2)
Preventive Action (8.5.3)
Analysis of data (8.4)

This system is designed for use in production environment. This system gives indications to the end users regarding the behavior of process. The user has to take necessary action based on the observations of behavior of process. This system does not control any process.

PLEASE NOTE*: *The modules available on your machine will be as per Purchase and Installation by you. However, you may view information of all modules within the system using the Online Help System.

The conceptual structure of ProQMS-Xtra is built around the following concepts:
Making a Database Connection
Company Settings
Configuration
The Quality Assurance Plan
Work Order

Work Order QAP
Batch Maintenance
Job
Monitoring

Data Acquisition
Analysis and Improvement
Non-conformity Management
Multi -Gauge Recording and Analysis of Quality Data
Measurement Systems Analysis
Tool Life monitoring

1.2 SPC Formulas

Standard SPC Formulas

1. SD = $\bar{R}$/D2
2. Cp = USL – LSL / 6 * SD
3. Cpk = min (Cpl, Cpu)
4. Cpl = $\bar{X}$ – LSL / 3 * SD
5. Cpu = USL - $\bar{X}$ / 3 * SD
6. SD (n-1) (for n-1 samples) = sqrt [((X1^2 + X2^2 +…Xn2) – n (XBAR)^2) / (n-1)]
7. Pp = (USL – LSL) / 6 * SD (n-1)
8. Ppk = min (Ppl, Ppu)
9. Ppl = ($\bar{X}$ – LSL) / (3 * SD (n-1))
10. Ppu = (USL – $\bar{X}$) / (3 * SD (n-1))

FOR XbarR Chart :

11. LCLx = $\bar{X}$ – (A2 * $\bar{R}$)
12. UCLx = $\bar{X}$ + (A2 * $\bar{R}$)
13. UCLr = (D4 * $\bar{R}$)
14. LCLr = (D3 * $\bar{R}$)

FOR XbarS Chart :

15. UCLs = B4 * $\bar{S}$
16. LCLs = B3 * $\bar{S}$
17. LCLx = $\bar{X}$ - (A3 * $\bar{S}$)
18. UCLx = $\bar{X}$ + (A3 * $\bar{S}$)
19. S = SD (n-1) for each sub-group

FOR XMR Chart :

20. UCLmr = D4 * $\bar{R}$
21. LCLmr = D3 * $\bar{R}$

22. $UCLx = \overline{\overline{X}} + E2\,\overline{R}$

23. $LCLx = \overline{\overline{X}} - E2\,\overline{R}$

Chi-Square Goodness-of-Fit Test

In SPC, the chi-square statistic is used to determine how well the actual distribution fits the expected distribution. Chi-square compares the number of observations found in each cell in a histogram (actual) to the number of observations that would be found in an expected distribution. If the differences are small, the distribution fits the theoretical distribution. If the difference are large, the distribution probably does not fit the expected distribution.
Using Chi-square with the assumption of a normal distribution

1. The calculated chi-square is compared to the value in the table of constants for chi-square based on the number of "degrees of freedom."
2. If the calculated chi-square is less than the value in the table, the chi-square test passes. You can keep the assumption that the process has a normal distribution.
3. If the chi-square is larger than the value in the table, the chi-square test fails. At this confidence level, you either do not have enough data to judge the process, or you should reject the assumption that the process has a normal distribution.

For chi-square test:

Good cell defined
A cell where the expected number of observations is at least 5 based on the theoretical distribution (normal curve). If the expected number of observations is not 5 or more as per Duncan), then the cells width is increased until the expected value of 5 or more is reached. If all readings are fitting in only 1 Cell after combining Chi Square test can not be performed.

Degrees of freedom = n - 1. where n is no of classes.
Confidence level can be set from Chart > Options to 95%, 99% and 99.1%.

Formula:

$$\text{Chi-square}\ \chi^2 = \sum_{I=0}^{K} (Oi-Ei)^2 / Ei$$

where K-1 is degree of freedom and K no of class intervals.

Where:

Oi = actual frequency or number of observations in a cell

Ei = expected frequency or number of observations in a cell in the theoretical distribution

$\sum$ = symbol for "summation."

Skewness Value

Skewness is the measure of the asymmetry of a histogram (frequency distribution). A histogram with normal distribution is symmetrical. In other words, the same amount of data falls on both sides of the mean. A normal distribution will have a skewness of 0. The direction of skewness is to the tail. The larger the number, the longer the tail. If skewness is positive, the tail on the right side of the distribution will be longer. If skewness is negative, the tail on the left side will be "longer."

Formulas

$$\text{Skewness} = \frac{N}{(N-1)*(N-2)} * \sum_{i=1}^{N} ((Xi - \bar{X})/S)^3$$

$\bar{X}$ = mean N= No. of data points S= standard Deviation

Kurtosis value

Kurtosis is a measure of the combined weight of the tails in relation to the rest of the distribution. As the tails of a distribution become heavier, the kurtosis value will increase. As the tails become lighter the kurtosis value will decrease. A histogram with a normal distribution has a kurtosis of 0. If the distribution is peaked (tall and skinny), it will have a kurtosis greater than 0 and is said to be leptokurtic. If the distribution is flat, it will have a kurtosis value less than zero and is said to be platykurtic.

Formulas

$$\text{Kurtosis} = \frac{N*(N+1)*\sum_{i=1}^{N} ((Xi - \bar{X})/S)^4}{(N-1)(N-2)(N-3)} - \frac{3*(N-1)^2}{(N-2)(N-3)}$$

$\bar{X}$ = mean, N = No. of data points S= standard Deviation

Non Parametric method for PPK Calculation

Formula:

Pp = (USL - LSL)/(P(0.99875) - P(0.00135))

Ppk = Min {(P(0.5) - LSL)/(P(0.5) - P(0.00135)), (USL –P(0.5)) / (P(0.99875) - P(0.5))}

Box Cox Transformation for CPK Calculation

Box-Cox is a method of transformation of data to make it normal or more nearly normal.

Formula:

$$Yi(\lambda) = (Xi^{\lambda} - 1) / \lambda$$

After transformation of data using above method Cp, Cpk, Pp, Ppk is calculated with standard formulas.

λ is Calculated using log likely hood function. Which is

The logarithm of the likelihood function

$$(-n/2)LN\left[\sum_{I=1}^{n}(Xi(\lambda)-\bar{X}(\lambda))^2/n\right]+(\lambda-1)\sum_{I=1}^{n}LN(Xi)$$

Where $\bar{X}(\lambda)=1/n\sum_{i=1}^{n} Xi(\lambda)$

Note-

1. λ value is restricted from –10 to + 10.
2. If data contains any negative values Box Cox Transformation can not be performed.
3. To run Box Cox transformation Ms-Excel needs to be installed on the machine.

PPM Calculation

Formula:

1. Calculate Z upper=$(USL - \bar{X})/ \sigma$
2. Locate the value for Zupper in standard normal table.
3. Multiply (1-Z-value) by 100 to get the theoretical % above the upper spec Limit.

4. Similarly calculate $Z_{Lower}=(\bar{X}-LSL)/ \sigma$
5. Locate the value for Z_{lower} in standard normal table.
6. Multiply (1-Z-value) by 100 to get the theoretical % below the lower spec Limit.
7. DPM=$(Z_{upper} + Z_{lower}) * 10,000$

2 Getting started with ProQMS-Xtra

This chapter will help you to install **ProQMS-Xtra** and get acquainted with the main features by taking you on a quick tour of **ProQMS-Xtra**.

2.1 System Requirements

Pentium and above Win95/98/Me/2000/XP 64MB RAM or above 2 Parallel ports, 1 Serial Port for Single instrument like Mitutyo, Baker Caliper
ISA slots for Advantech Card, Specialix Card
Internet Explorer - IE 4.0 and above MDAC - 2.5 and above

2.2 Installation and License administration

Refer to the manual of installation and license administration.

2.3 ProQMS-Xtra Menu

The menu that appears on the top of the main screen is referred to, as Main menu. The toolbar menu comes below the main menu. These are illustrated below:

2.3.1 Main Menu and Toolbar[1]

If Tool Life Monitoring is included in the product installed then the toolbar displayed is as below:

The Main menu for **ProQMS-Xtra** has the following options. Let's take a look at each one of them.

File Menu

Option	Description
Add	Add new records.
Modify	Modify the details of a record.
Delete	Delete a record.

[1] The Main menu changes depending on the installation. Certain installations will have Tool life monitoring as part of them. In such case the menu changes accordingly.

Close	Close an active screen
Purging	To remove unused/old data
Uploading	To reload purged data
Save	Save after adding or modifying a record
Cancel	Cancel all changes to a record after adding or modifying a record
Backup	To take backup of **ProQMS-Xtra** database
Restore	To restore a selected database from backup directory, to directory specified with data source name.
Export To Excel	To display recorded data in the form of Excel Worksheets
QS 9000 Report	To display the QS9000 report for the selected jobs in a Preformatted report of Excel.
Import Data	To import reading data from an excel file and provide the facility for the statistical analysis.
E-mail	To mail reports
Logout …	To logout the currently logged in user, and display the login screen for another/same user, to log into the system.
Exit	Quitting **ProQMS-Xtra**

Configuration Menu

Option	Description
Departments	Allows configuration of all possible departments within the organization.
Users	Records all information about the users of the System.
Supervisors[2]	All the users who are supervisors are defined.
Roles	Allows creating a role and assigning the role to the users.
Parts	Defining the manufacturing part.
Process	Defining the various processes for the manufacturing part.
Part Parameters	Defining various parameters for which data will be captured for analysis of part and process
Parameters	Defining the various parameters for the tools that have to be monitored.
Locations	Defining locations, this will be used in defining Machine and Instrument.
Local	Define Local Machines.

[2] This option is available if Tool life monitoring is included in the installed project.

Machine	
Machine Types	Defining various machine types.
Machine	Defining machines used in the organization.
Instrument Types	Defining various instrument types.
Instruments	Defining the various instruments used in the organization.
Zone	Defining zone.
Parameter Category	Define different parameter for a Parameter Category which has LSL and USL.
Zone – Parameter	Configure Zone, Parameters and its Captured Reading Time, which will use while plotting a chart
Tray Time Entry	Configure Tray in Date, Time and Tray Number, which will use while plotting a chart.
Instrument Calibration	Add different Instrument No, Cal Step Code, LSL, and USL for creating relationship of Instrument with Calibration Step Code with LSL & USL.
Dashboard Master	Define various plants, Divisions, Units and Location/Cells.
Assign Dashboard Level	Assign the dashboard level to user.
Shared folder path of CSV files	Provide the grid for entering record for Share folder & test box for Data Fetching Frequency (In Min).
Email Escalation Master (Dashboard)	Create Email Escalation hierarchy like President, General Manager and Unit Manager and then assign unit to Unit Manager.
Country	Defining country.
Customers	Defining customers.
Customer-Parts	Defining parts used by customers, for parts manufactured.
Part-Machines	Gauging the performance of the part and the machine and the capacity of materials it produces per hour.
Unit Of Measurement	Defining of units, used for measurement of part parameter.
Trend Messages	To map Standard Messages with Customized Messages for the Trends raised.
Root Causes	Defining of root causes, which can be used later, to take Corrective actions.
Root Causes	Defining root causes details, for the root causes

Detail[3]	defined in root cause.
Shifts	The Shifts denote the shifts within which the users of the system are logged on.
GRR Result	Configures GRR result as per the user requirement.

Quality Planning Menu

Option	Description
Standard Quality Assurance Plan	Defining the planed, quality standards for a part, component to be manufactured.

Monitoring Menu

Option	Description
Job Creation	Creation of Job and Work Order.
Local Monitoring	Displays all jobs, which are created on the local machine, for measurement.
Machine Event	Create machine event for selected machine, event date, event time & jobs for selected machine.
Import Monitoring	Display all jobs, which are imported on the local machine from the import menu option.
Global Monitoring	Displays all jobs created on different machines.
Corrective Action Completed	Displays the list of the parts for which the corrective action has been taken.
Job Closure	Select the job to be closed.
Gauge Calibration	Records and maintains the Calibration details for an Instrument.

Measurement Systems Analysis Menu

Option	Description
Gauge R & R Study	Gauge R & R Mapping, Measurement and Data Analysis.
Linearity Study	Linearity Mapping, Measurement and Data Analysis.
Stability Study	Stability Mapping, Measurement and Data Analysis.
Bias Study	Bias Mapping, Measurement and Data Analysis.

Tool Life Monitoring Menu

Option	Description

[3] This option is available if Tool life monitoring is included in the installed project.

Tool Type	Defining tool types and selecting the parameters for the tool types.
Tool Master	Displays the information of tools and its parameters.
Model Shift Target	Defining shift target for a specified model, machine and shift.
Machine-wise Operation	Allows linking of a machine to various operations.
Operation-wise Machine	Allows linking of an operation to various machines.
Operation Tool Link	Allows linking of an operation to various tools.
Model Tool Link	Allows linking of a model to machine, operation, and tool types.
Tool Issue For Production	Allows issuing of tools for production.
Tool Parameter Change	Allows changing the values of a parameter to track, a life of tool for changed values.
Production	Allows entering the quantity produced, at the end of the shift production.
Tool Changing	Allows changing the tool, used in production and replacing it with new tool.
Balance Tool Life	Displays the information about the tools that are being used for production.

Reports Menu

Option	**Description**
Charts	Displays charts for a job when *Local Monitor, Fixture Monitor* or *Global Monitor* screen is active.
Tray Tracking	Displays Tray tracking chart for variation of parameter category.
Weekly Cp/Cpk/Pp/Ppk Trend Chart	Displays weekly trend chart of Cp/Cpk/Pp/Ppk for selected date for current or history job.
History	A click on this option displays a sub menu. For details refer below.
History |Chart	Displays history charts for closed jobs.
History| Process Capability Study Report	Displays the Process Capability details for the selected Jobs in Excel.
History| Process Capability Study Report – Run Chart	Displays the Process Capability-Run Chart details for the selected Jobs in Excel.

History| Process Capability Study Report - Histogram	Displays the Process Capability-Histogram details for the selected Jobs in Excel
History |Summary Report	Displays history summary report for closed jobs.
History |Readings	Displays history readings for closed jobs.
History |All Parameter reading report	Display information of selected jobs that cover Part code, Part Name, Job No, Process, Machine, Parameter, USL Value, LSL Value, Reading Serial No, Readings on Excel sheet.
History | Export To Excel	Exports history data to Excel Worksheets.
History | QS 9000 Report	To display the QS9000 report for the selected closed jobs in a Preformatted report of Excel.
History | Trend Summary report	Display the Summary of Trends i.e. counts of each raised Trends for the closed jobs.
History | Remarks report	Display the event remarks that have been already entered for samples and readings of selected job.
Machine-wise Analysis	Displays machine-wise analysis report, which gives details about part, process and all work orders, control limits, Cp, Cpk, Pp & Ppk.
Gauge Calibration	A click on this option displays a sub menu. For details refer below.
Gauge Calibration | History Calibration	Displays information of Instrument No, Calibration date, Calibration due date, Calibrated In house /Company, Remarks, Step code, Description, LSL, USL, Wear Value
Gauge Calibration |Gauge Calibration Due During	Displays gauge calibration due during report, for instruments along with the calibration date, location and who is responsible for the same.
Gauge Calibration |Gauge Calibration Over Due As On	Displays gauge calibration due during report, for instruments along with the calibration due date, location and who is responsible for the same.
Quality Assurance Plan Summary	Displays report on the summarized Quality Assurance Plan
Quality Assurance Plan Detail	Displays report for the detailed information about quality assurance plan for the selected part(s).
Audit Trail for	Displays report for the samples, which

Homogenized Samples	have been homogenized.
Cost of Internal Rejection	Displays report for the cost of raw material, cost of repair, cost of processing and the Disposal action for a closed job.
Summary Report	Displays summary report, of the selected job during the specified period.
All Parameter Readings Report	Display report for all details related to a job.
All Parameter Readings Report (Different Job – One Part)	Display the record of multiple jobs with all parameter of different job for one part at a glance.
All Parameter Readings Report (Station wise)	Display report of all jobs that come under selected period for selected station no.
Resend Trend Email	Provide user interface for Resending Trend Email
Part wise Daily Cp/Cpk Pp/Ppk report	Displays the Parameter names, date of Job/Work Order creation, Part no, Work order no, Machine no, Operator code, Process code, Cp and Cpk or Pp and Ppk. Cp and Cpk or Pp and Ppk will be categorized under three columns - >1.33, 1.33, <1 each
Parameter Cp/Cpk Pp/Ppk Summary report	Displays the summary of all readings and Cp Cpk or Pp Ppk details for the selected parameter
Part Wise Summary Report	Displays the summary information of each selected part on different sheet and also all the jobs of that part.
Export Data of Component Number Report	Displays the process wise parameter values for the selected component number.
Date-Wise Export Data of Component Number Report	Displays the date wise component number with parameter values for the selected period, part number and process.
Corrective Action Trend	Displays report for trends raised.
Trend Summary	Display the Summary of Trends i.e. counts of each raised Trends.
Trend V/S Rejection	Display the reading of trends of the variable parameter of the selected job.
Remarks Report	Display the event remarks that have been already entered for samples and readings.
Balance Tool Life	Displays report, for the balance life of a tool.

Model Wise Report	Displays report, for the detailed information about the tools, its parameters, for the selected Model(s).
Operation Wise Report	Displays report, for the detailed information about the tools and life of the tool for the selected Machine(s).
Production Report	Displays details about production of a model, for a machine and shift.
Tool Parameter Change	Displays report, for the life of a tool, for different values of the parameter.
Tool Change	Details of the tool changed and the reason for the tool change.

Settings Menu

Option	Description
Settings	A click on this option displays a sub menu. For details refer below.
Settings| Database	Allows setting the database, for storing the process quality data.
Settings| Company	Defining company information.
Settings| Trend Settings	Setting the trends for X Bar R chart in Measurement screen.
Settings | Configurable Parameters	Accepts Percentage of Specs Limit for Ignore Readings.
Toolbars	A click on this option displays a sub menu. For details refer below.
Toolbars| Navigation	Option is checked to display navigation toolbar.
Toolbars| Database	Option is checked to display add, modify, delete.
Toolbars| Statistical Analysis	Option is checked to display all tool bar buttons
Status bar	Option is checked to display status bar.

Window Menu

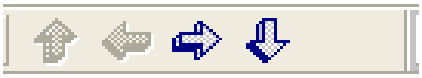
Option	Description
Tile Horizontally	Arranging all open MDI child windows side-by-side horizontally.
Tile Vertically	Arranging all open MDI child windows vertically.
Cascade	Arranging the windows by stacking them on top of each other such that only the title bar of each window is visible.

Help Menu

Option	Description
Contents	Viewing the on-line help contents.
About	Viewing copyright and support details of ProQMS-Xtra.

2.4 ProQMS-Xtra Toolbar

2.4.1 Navigation Toolbar



The following table describes Navigation Toolbar.

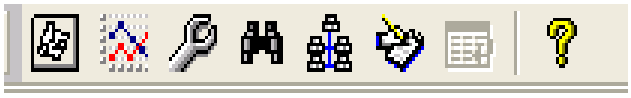
Button	Description
Top	Click on the button to go to the first record.
Prev	Click on the button to go to the previous record.
Next	Click on the button to go to the next record.
Last	Click on the button to go to the last record.

2.4.2 Database Toolbar

The following table describes Database Toolbar.

Button	Description
Add	Add a new record.
Modify	Modifies an existing record.
Delete	Deletes the selected record.
Save	Saves the record.
Cancel	Cancel all changes made to the record.
Exit	Closes the current window.

2.4.3 Statistical Toolbar



The following table describes Statistical Toolbar.

Button	Description
Standard Q.A.P	To view Standard Quality Assurance Plan.
Display Charts	To view charts for a job when *Local Monitor*, *Fixture Monitor* or *Global Monitor* screen is active.

Job Creation	To create a job.
W.O.	Work order maintenance is included in the product installed; it allows defining a new work order. Work Order & Job Creation is included in the product installed; it allows defining work order & job.
WO QAP	To view work order QAP, of part.
Local Monitoring	To view all jobs, which are created on the local machine?
Global Monitoring	To view all jobs created on different machines.
Display Report	To view reports for the active screen.
Job Closure	To close jobs from Local Monitor, Fixture Monitor or Global Monitor.
WO Close	To close work orders from WO QAP.

2.4.4 Tool Life Monitoring Toolbar

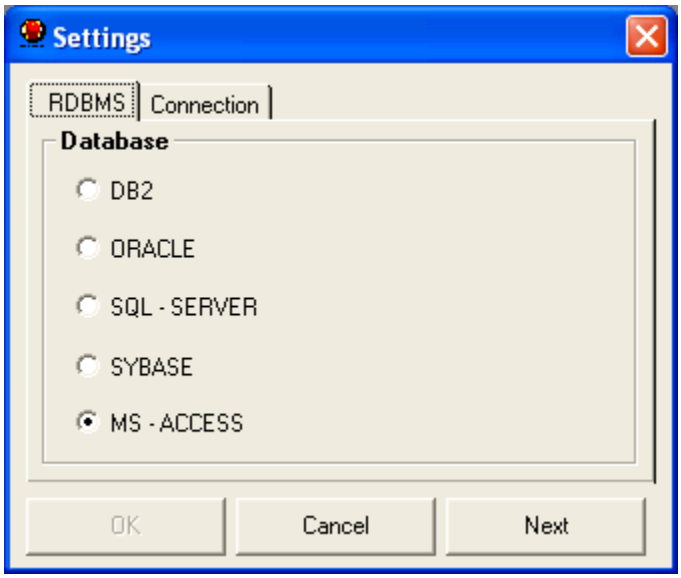
The following table describes Tool Life Monitoring Toolbar.

Button	Description
Balance	To view information about the tools, those used for production.
Production	Allows entering the quantity produced, at the end of the shift production.

2.5 Making a Database Connection

You may connect to any database, remote or local for storing the process quality data. This may be done on the below screens, which has the two tabs **RDBMS** and **Connection.**

RDBMS Tab

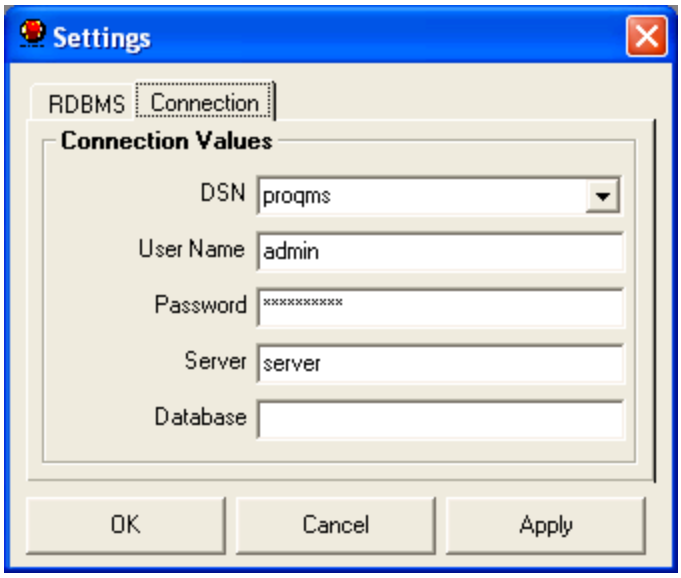


On the **RDBMS** screen you may specify the database from the following list:

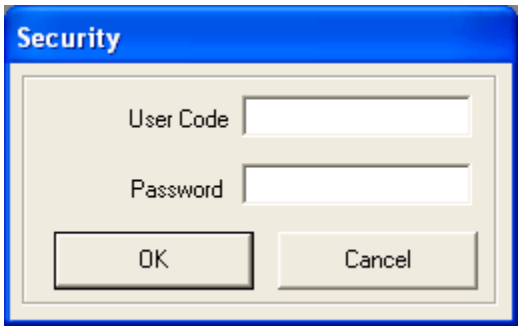
- DB2
- ORACLE
- SQL-SERVER
- SYBASE
- MS-ACCESS

After completing the desired selection click **Next** to move to the next tab.

Connection Tab



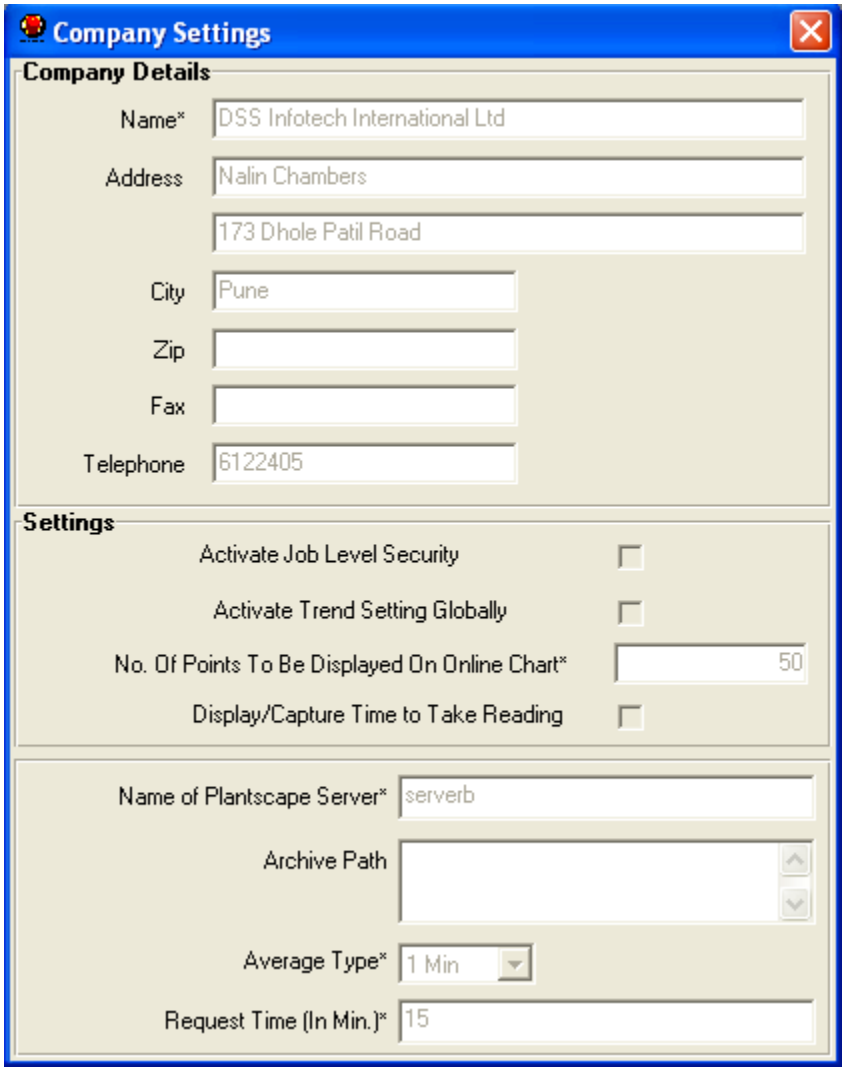
On the **Connection** tab enter the following information related to the database connection that you want to create:
DSN – Data Source Name is a term for the collection of information used to connect your application to a particular ODBC database.
User Name - The user ID which is accessed for providing security to the database.
Password – The password is used to provide database access to an authorized user only.
Server – Server Name
Database – Database Name
Once you have entered the necessary information, click **Apply** and then click **OK** which displays the security screen shown below. You may leave this dialog without modification by clicking **Cancel**.



If the **User Code** and **Password** entered are of a valid user then click on **Ok** button to log on to the **ProQMS-Xtra** application.

2.6 Company Settings

Use this option to enter information related to the company and make required settings.



Click **Modify** on the toolbar to make changes. The following information is entered on this screen:

- **Name**
- **Address**
- **City**
- **Zip**
- **Fax**
- **Telephone**
- **Activate Job Level Security** – Check this option if you want to enforce authorization checks at the launch of *Local Monitoring* and *Fixture Monitoring* screens. This means only authorized users can access these screens.

- **Activate Trend Setting Globally –** Check this option if you want the Trend Settings to be applicable to all machines.
- **No. Of Points To Be Displayed On Online Charts** – Specify the number of samples that should be displayed in the online charts of the measurement screens.
- **Display / Capture Time to Take Reading** – User checks the 'Display/Capture Time to Take Reading' if user has not taken the reading for specified sample frequency then 'Time to take Reading' Event/Trend will get captured. If user does not checks then 'Time to take Reading' Event/Trend will not get captured.

When g_HeatTreatment flag is true then frame, which contains Name of Plantscape Server, Archive Path, Average Type and Request Time (In Min.) will get visible.

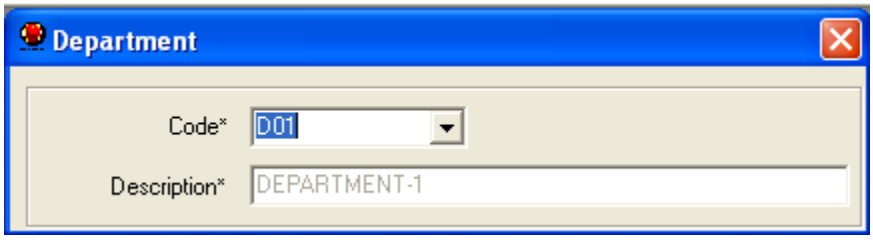
- **Name of Plantscape Server** – Enter the name of Plantscape Server.
- **Archive Path –** Enter Archive path (the only field which is optional)
- **Average Type –** Select a pre-defined value from drop down list.
- **Request Time –** Enter Request Time which is multiples of 5 of Average Type or more than that.
- Click **Save** to save the settings.

3 Setting up the Configuration Menu

Use the Configuration Menu to enter master data into the system. Create the masters in the sequence provided in this menu.

3.1 Department

Select **Configuration|Departments** from the Main Menu to display the *Department* master. Use this option to enter all departments within the organization. Each department is identified by a unique department code.



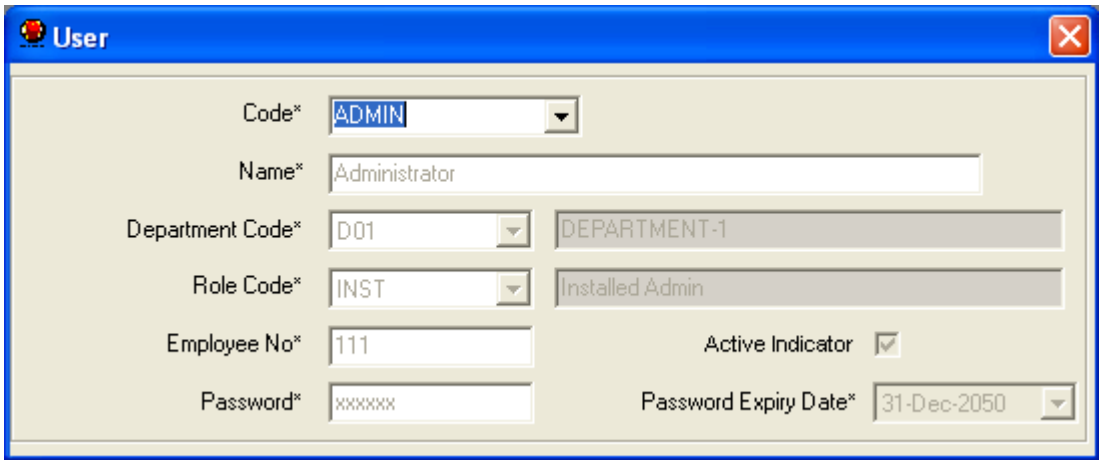
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Department code.
- **Description** – The name of the Department.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You cannot delete a department if it is used in the *User* Screen.

3.2 Users

Select **Configuration|Users** from the Main Menu to display the *User* master. Use this option to enter information about the members of the organization.



Click **Add** to add a new entry. Enter the following details:

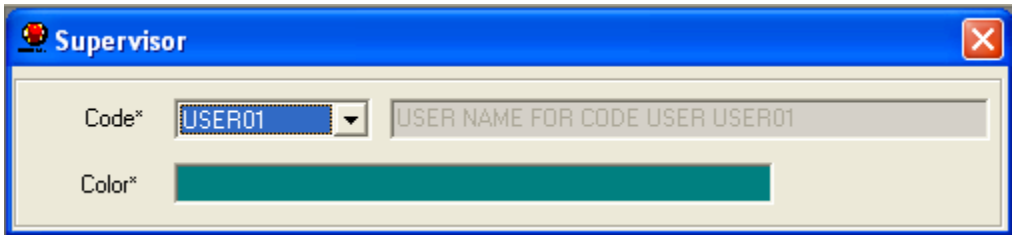
- **Code** – A unique code to identify the user of the application.
- **Name** – The name of the user.

- **Department Code** – The department to which the user belongs. Departments are defined in the *Department master*.
- **Role Code** – The role assigned to the user. Roles are defined in the *Role master*.
- **Employee No** – The employee number assigned to the user.
- **Active Indicator** – This indicates if the user is active in the organization. A non-active user is not allowed to log into the application.
- **Password** – The password used to log into the application.
- **Password Expiry Date** – The date till which the user's password is active. After this date the user cannot login. 7 days prior to the expiry date, a message is displayed that the password is about to expire.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. A user cannot be deleted if he is logged in.

3.3 Supervisor

Select **Configuration|Supervisors** from the Main Menu to display the *Supervisor* master. Use this option to define Supervisors.



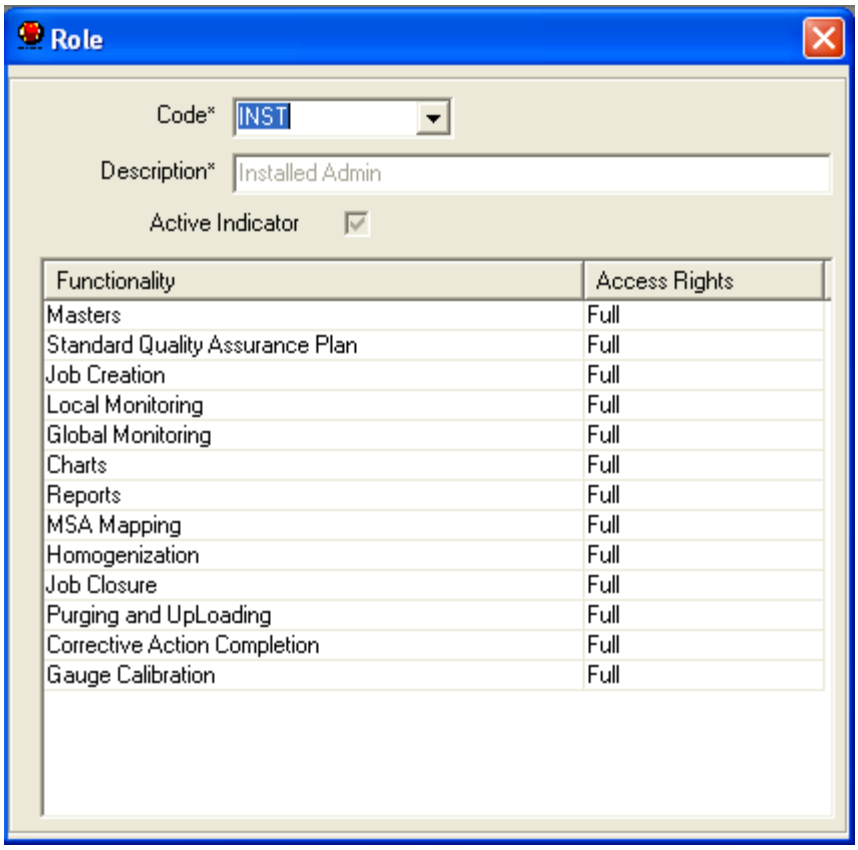
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Supervisor code. Supervisors are users defined in the *User* master.
- **Color** – Select the required color. This color code is helpful at the time of report generation.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. Modification and deletion is allowed only if the supervisor is not used in the *Production* screen.

3.4 Roles

Select **Configuration|Roles** from the Main Menu to display *Role* master. Use this option to create different roles that are required for the organization.



Click **Add** to add a new entry. Enter the following details:

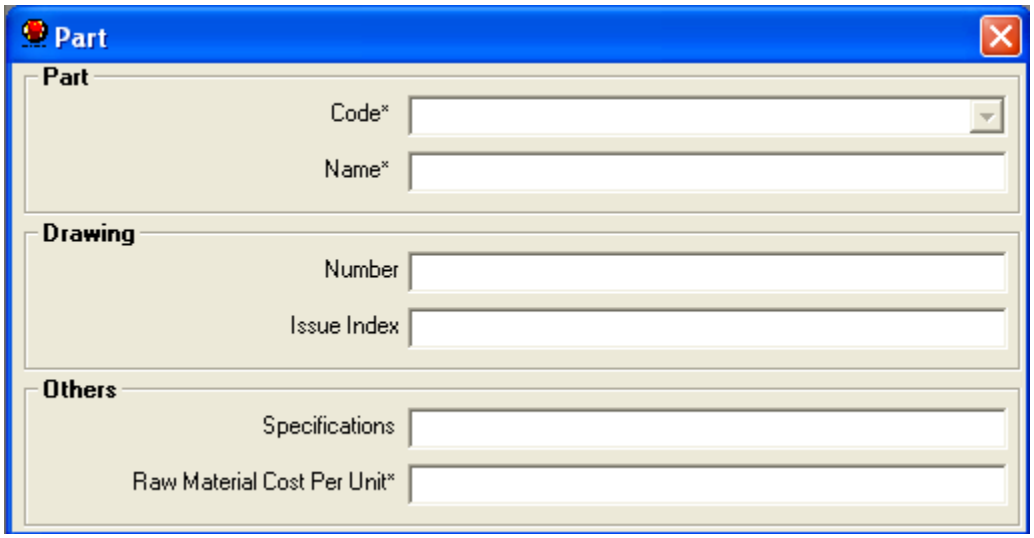
- **Role Code** – The Role code.
- **Description** – The description of the role.
- **Active Indicator** – This indicates if the role is currently active in the organization. If the active indicator is not checked then users cannot be assigned this role
- **Functionality and Access Rights** – The various functionalities i.e. screens of the application are listed. You may define the access rights for all the screens. By default the access rights for each screen is *None*. A user has access to the screens of the application based on these access rights.

Access Rights	**Description**
None	No access is available to the screen.
Read Only	You can only view the screen.
Modify	You can modify the contents of the screen, but cannot Add or Delete
Full	You can Add, Modify and Delete the contents of the screen.

Click **Modify** to modify details. If the **Active Indicator** is checked then you can un-check it only if no users exist for the role. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a Role only if no users exist for that role.

3.5 Part

Select **Configuration|Parts** from the Main Menu to display the *Parts* master. Use this option to define the manufacturing parts.



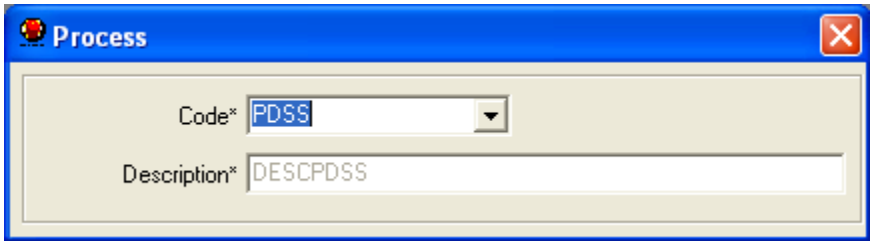
Click **Add** to add a new entry. Enter the following details:

- **Code –** The Part code.
- **Name –** The name of the Part.
- **Number** – The Drawing number.
- **Issue Index** – The issue index of the Part.
- **Specification** – Specification details.
- **Raw Material Cost Per Unit** – The cost of raw material per unit.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a part only if the *Standard Quality Assurance Plan* is not defined for the part.

3.6 Process

Select **Configuration|Process** from the Main menu to display the *Process* master. Use this option to define various processes for the manufacturing parts.



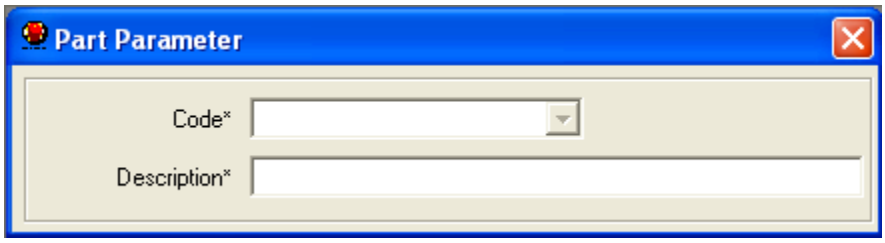
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Process code.
- **Description** – The description of the Process.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a process only if it is not used in defining the *Standard Quality Assurance Plan* for a part.

3.7 Part Parameter

Select **Configuration|Part Parameters** from the Main menu to display the *Part Parameter* master. Use this option to define parameters for which measurement data will be captured for analysis of the part and process.

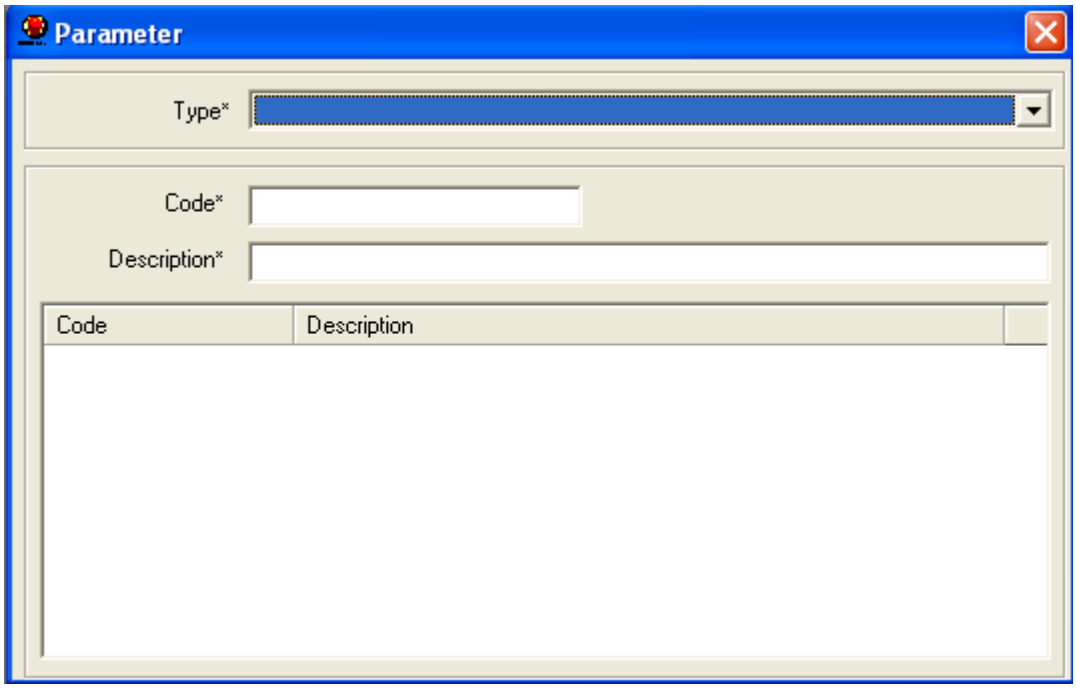


Click **Add** to add a new entry. Enter the following details:

- **Code** – The Parameter code.
- **Description** – The description of the Parameter.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a parameter if it is not used in defining the *Standard Quality Assurance Plan* for a part or for fixture settings.

3.8 Parameter



Select **Configuration|Parameters** from the Main Menu to display the *Parameter* master. Use this option to define the various parameters for the Tools that have to be monitored. This master is used in the *Tool Life Monitoring Module.*

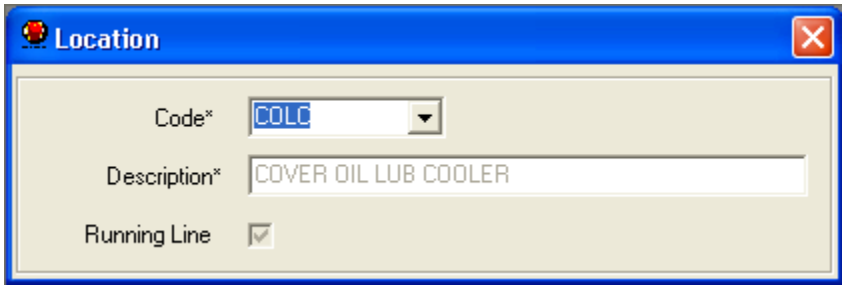
Click **Add** to add a new entry. Enter the following details:

- **Type** – Select the Tool Parameters as a type from the drop down list.
- **Code** – The Parameter code.
- **Description** – The description of the Parameter.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a parameter if it is not used in defining a tool type in the *Tool Type* screen & Event Remark for Machine Event.

3.9 Location

Select **Configuration|Locations** from the Main Menu to display the *Location* master. Use this option to define locations which will be used in defining the *Machine* master and *Instrument* master.



Click **Add** to add a new entry. Enter the following details:

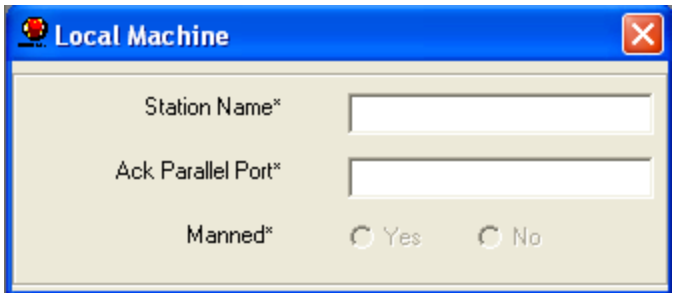
- **Code** – The Location code.
- **Description** – The description of the Location.
- Running Line check box - By default checkbox should be checked.

This will be used in web dashboard to know whether selected location/cell is in running state or not, if running line unselected then back color of that location/cell display in white color.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a location only if it is not referenced in the *Machine* master or *Instrument* master.

3.10 Local Machine

Select **Configuration|Local Machine** from the Main Menu to display the *Local Machine* master. Use this option to define Local Machines.



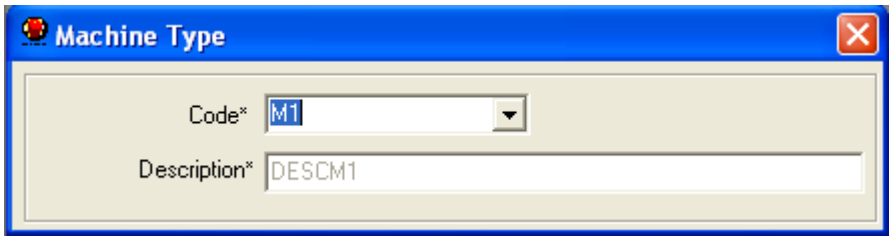
Click **Add** to add a new entry. Enter the following details:

- **Station Name** – The name of the Station.
- **Ack Parallel Port** – The Acknowledgement Port.
- **Manned** – Whether Manned or not. By default this is set to *Yes*.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record.

3.11 Machine Type

Select **Configuration|Machine Types** from the Main Menu to display the *Machine Type* master. Use this option to define various machine types.



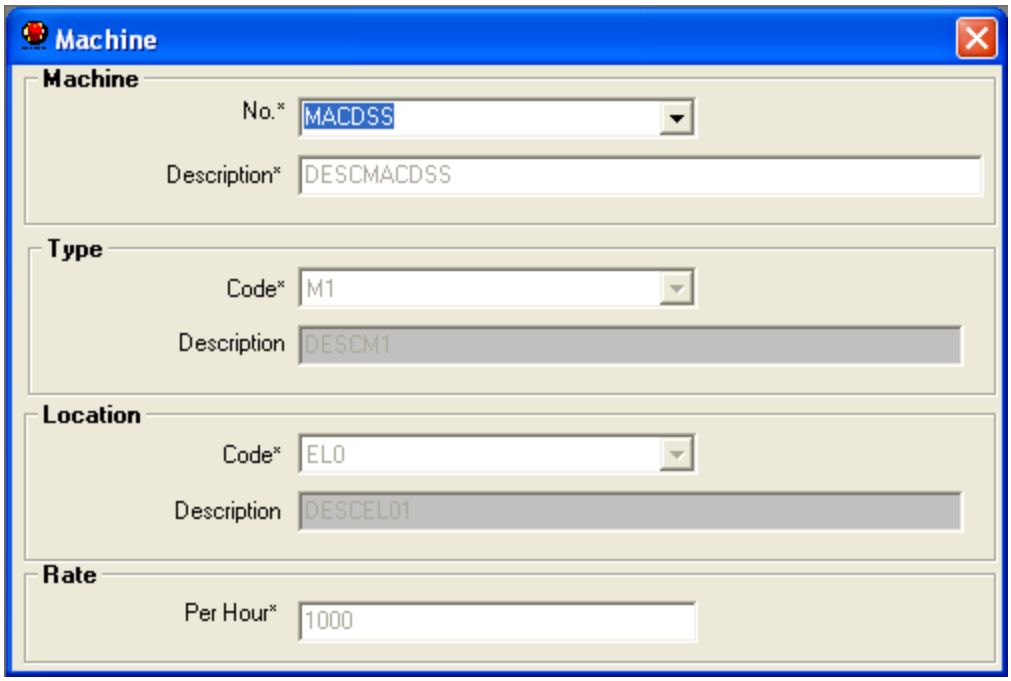
Click **Add** to add a new entry. Enter the following details:

- **Type** – The type of machine.
- **Description** – The description of the Machine Type.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a machine type only if it is not used in the *Machine* master.

3.12 Machine

Select **Configuration|Machine** from the Main Menu to display the *Machine* master. Use this option to enter details of the different Machines.



Click **Add** to add a new entry. Enter the following details:

- **Machine Number** – The number identifying the machine.
- **Machine Description** – The description of the Machine.
- **Location Code** – The location code where the machine is.
- **Location Description –** The name of the location.
- **Rate Per Hour –** The hourly rate of production.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a machine only if a Job has not been created for it.

If user try to delete the machine, which is exist in machine event. then system prompt the message 'Cannot delete. Record exists in Machine Event screen'

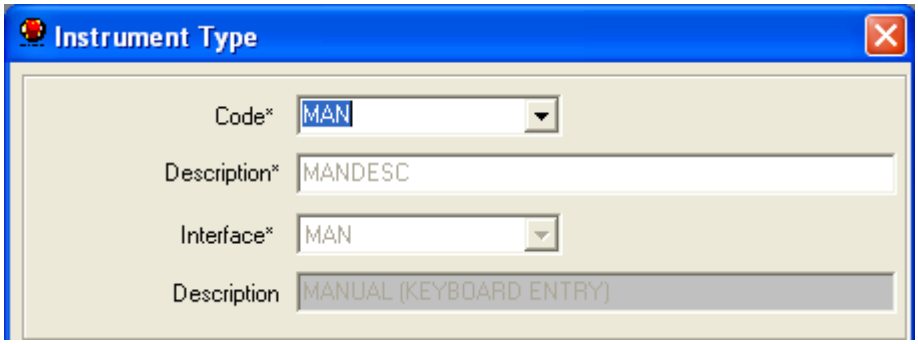
3.13 Instrument Type

Select **Configuration|Instrument Type** from the Main Menu to display the *Instrument Type* master. Use this option to access details of the types of instruments, their interface and port setting details.

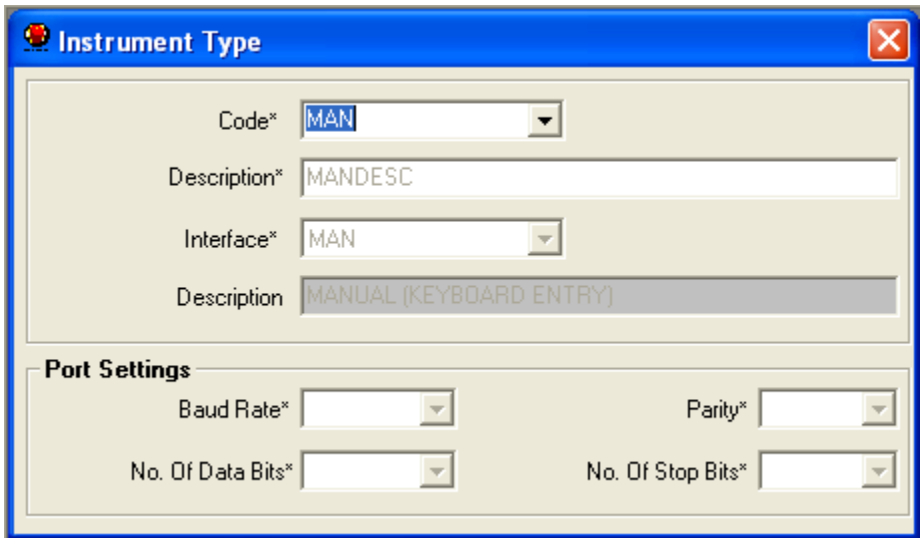
Following are the fields giving details related to Instrument Types:

- **Code** – The Instrument Type code
- **Description** – The description of the Instrument Type
- **Interface** – The interface for the instrument type. The interface codes are defined in the *Interface* master.

When the interface selected has a *parallel port setting*, the following screen is displayed.



When the interface selected has a *serial port setting*, the following screen is displayed.



Enter the following fields for *serial port setting:*

- **Baud Rate**
- **Parity**
- **No. Of Data Bits**
- **No. Of Stop Bits**

Click **Add** to add a new entry. Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete an instrument type only if it is not referenced in the Instrument master.

3.14 Instruments

Select **Configuration|Instruments** from the Main Menu to display the *Instrument* screen. Use this option to access information related to Instruments.
Following are the fields to be entered:

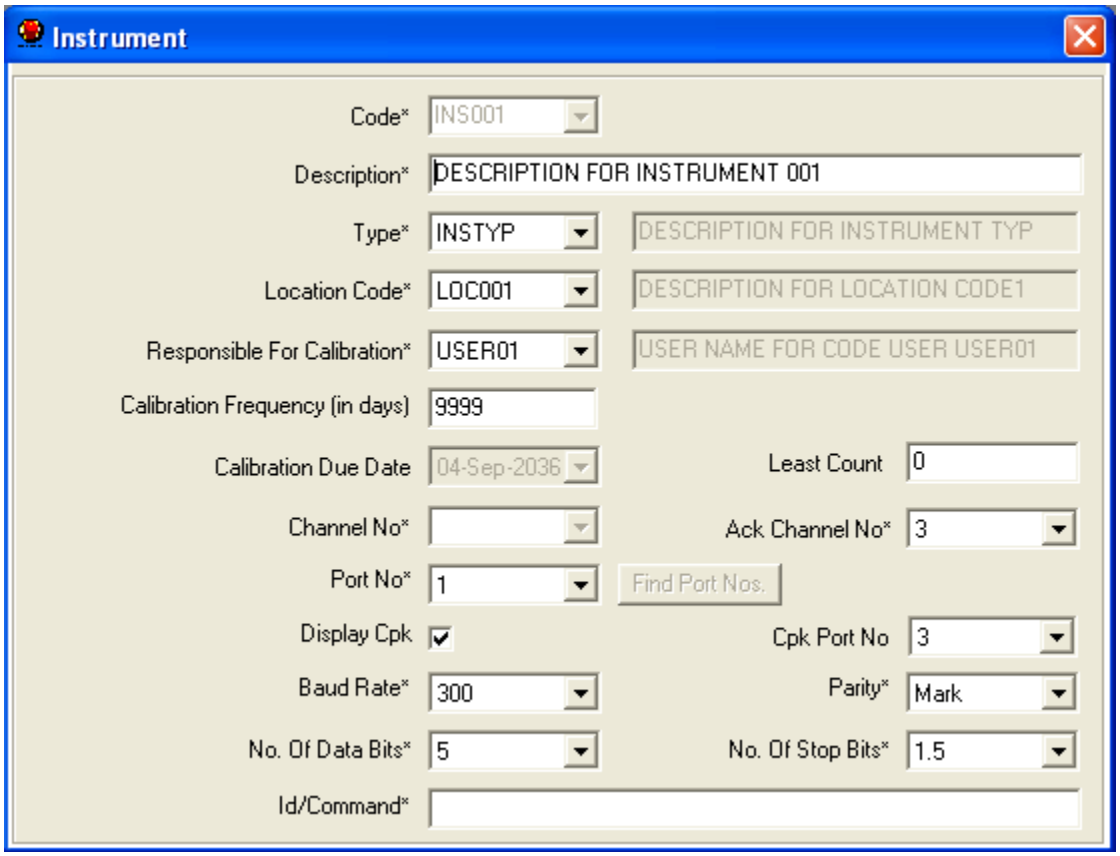
- **Code** – The Instrument code.
- **Description** – The description of the Instrument.
- **Type** – The type of instrument. The instrument type may have serial port or parallel port interface. The instrument types are defined in the *Instrument Type* master.

- **Location Code** – The location of the instrument on the production floor. The location codes are defined in the *Location* master.
- **Responsible For Calibration –**The person responsible for calibration of the machine. Such persons are defined in the *User* master.
- **Calibration Frequency (in days) -** Enter calibration frequency in days that user want to calibrate & maintain the history.
- **Calibration Due Date –** The date on which the instrument is due for calibration. The current date is displayed by default. Enter a date not less than the current date.
- **Least Count –** The least count of the instrument.
- **Channel No. –** This must be entered if the instrument type entered has *parallel port interface.* This is the exact Channel No. to which the instrument is connected. Select it from the drop down list which contains numbers from 1 to 16. The interface code for a specific instrument is based on the *instrument type.* The number of channels for an interface code are specified on the *Instrument Interface* master. The channel no. cannot be greater than the number of channels specified for that interface code.
- **Ack Channel No. –** This is the Acknowledgement Channel No. to which the physical panel is connected. Select it from the drop down list which contains numbers from 1 to 16.
- **Port No.** - This is the actual Port No. to which the instrument is connected. Click **Find Port Nos.** to display the *Find Parallel Port* Screen which shows all the parallel ports on the machine. Select the required record from the grid. This is displayed in the **Port No.** field.
  If the instrument type entered has *serial port interface* then the following fields must be entered.
  - **Baud Rate**
  - **Parity**
  - **No Of Data Bits**
  - **No Of Stop Bits**

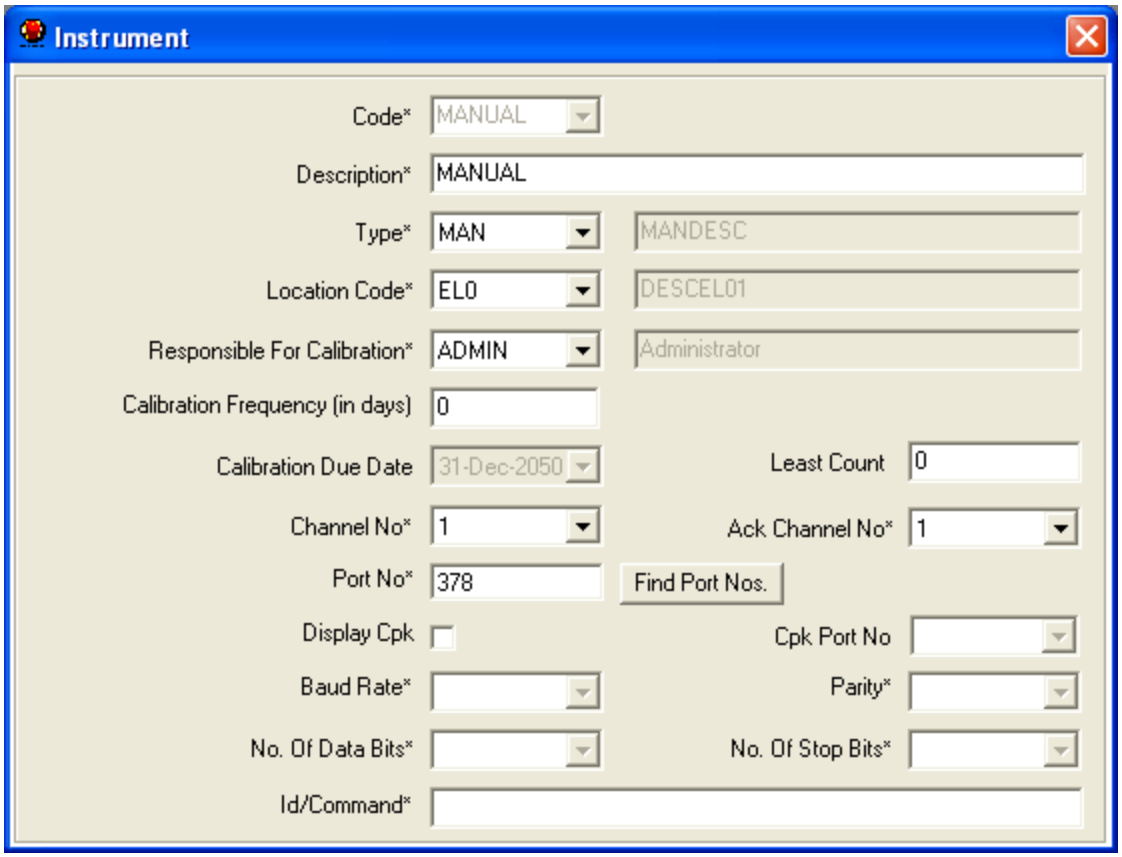
The above fields are displayed from the *Instrument Type* master based on the instrument type code entered. You can change them if required.

Display Cpk –

If DisplayCpk checkbox is true, Cpk Port No combo box will get enable otherwise disable.
If Instrument type has parallel port interface and display Cpk is Checked then Baud Rate, Parity, No of Data Bits, No of Stop Bits will get enable otherwise disable.
When instrument is type of serial port then same port or different port will be used for sending Cpk value. When instrument is type of Parallel port then separate serial port needs to be used for sending the Cpk value
For *Serial Port Interface* the following screen is displayed.



For *Parallel Port Interface* the following screen is displayed.



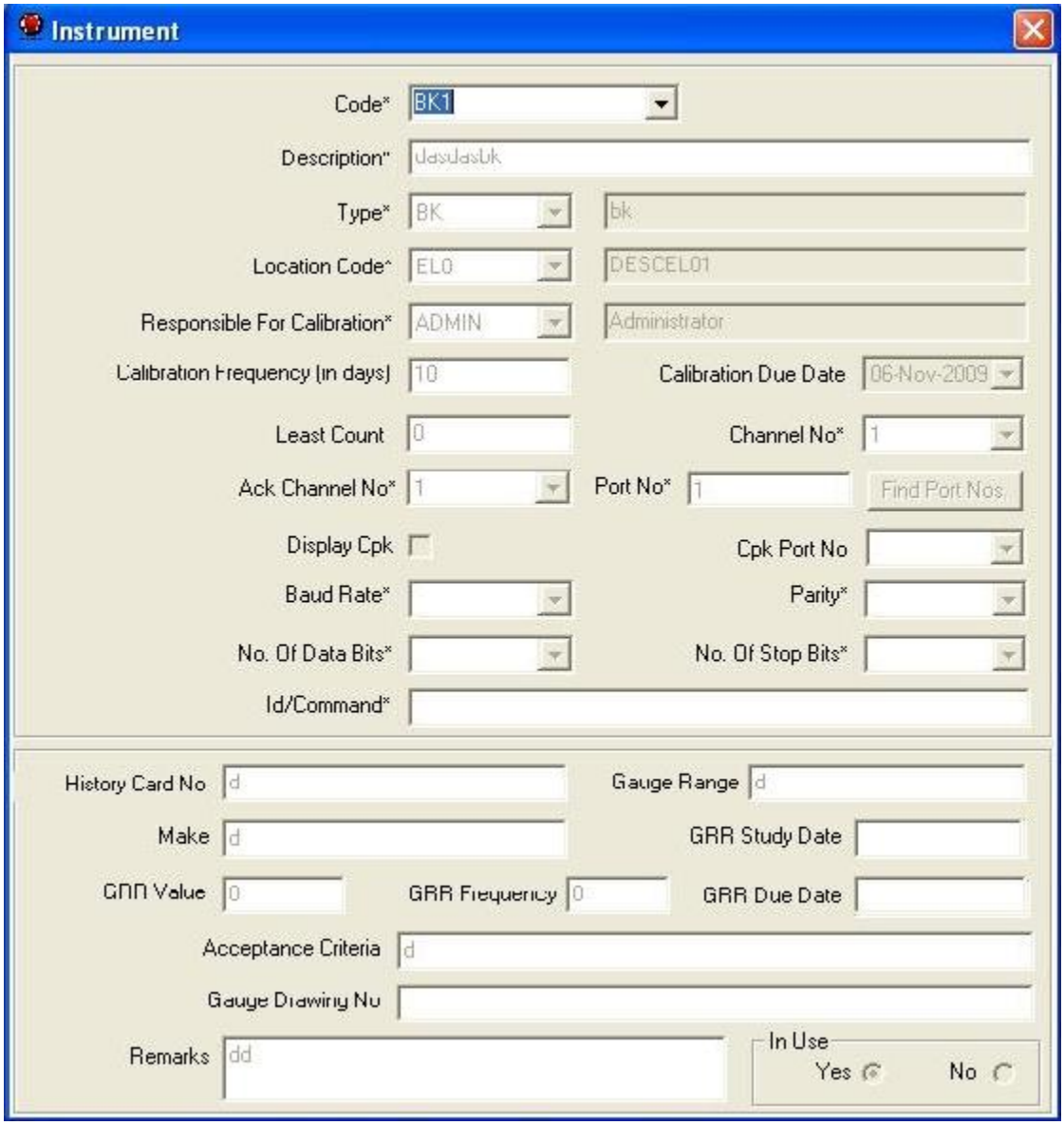
Click **Add** to add a new entry. Click **Modify** to modify instrument details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete instrument details. You can delete an instrument only if it is not referenced in a Job or in any mapping screen for Measurement Systems Analysis (MSA).

When Gauge Management flag is true then only user can see the following fields.

History Card No - History card number of the Instrument.
Gauge Range - Range of the Gauge
Make - Make of the Instrument
GRR Study Date - Study Date of Gauge R & R. This value will be update from the GRR Study.
GRR value - Gauge R & R value. This value will be update from the GRR Study.
GRR Frequency - Frequency of the Gauge R & R
GRR Due Date - Due Date of GRR
Acceptance Criteria - Acceptance Criteria of the Instrument
e.g. - Go + / - 0.002 & No-go + / - 0.003 mm
Gauge Drawing No. - Drawing Number of the Gauge
e.g. - M 5 249 8 1019 - P 000: 14
Remarks - Remarks of the Gauge
[Description-Part No-Dimensions to be measured]
In Use - Status of the Instrument.

When Gauge calibration is done then user can not change the Calibration Frequency. When Gauge R & R is done then user can not change the GRR Frequency.

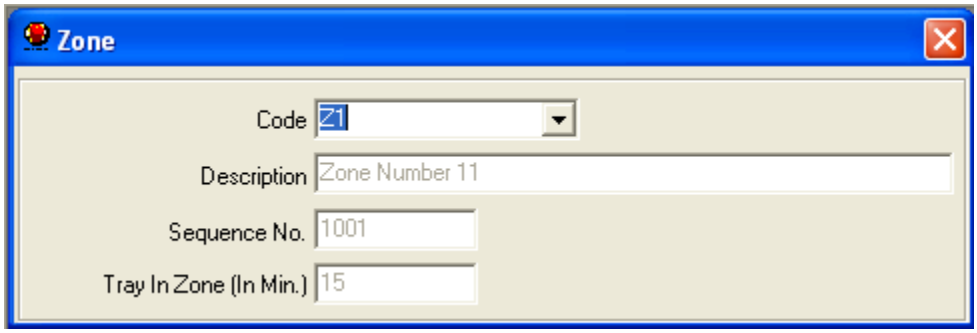
When user try to add new instrument and user entered Instrument code or Description and press function key f5 user can see the frame with Combo of Instrument Code: Description with OK and Cancel Button. When user selects the Instrument from the combo and clicked on Ok then software will populate i.e. copy all the fields of selected instrument to current instrument so that user can make the changes wherever is required and press save button from toolbar to save the record. If user presses cancel then nothing will get populated.



Listing of Instrument-
Gauge Management Flag is true. Instrument screen is Active and user press F6 key then the information of Instrument is exported in the Excel. If Instrument is 'Not In use' then Instrument number will be display in Red color else it will be in back color.
If GRR due Date is less than current date then GRR Due date will be display in Red color. If Calibration due Date is less than current date then Calibration Due date will be display in Red color.

3.15 Zone

Select **Configuration**| **Zone** from the Main Menu to display the *Zone* master. Use this option to define Zone, Zone Description, Zone Sequence No, and Tray in Zone, which will use for how much time tray, is present in specified zone.

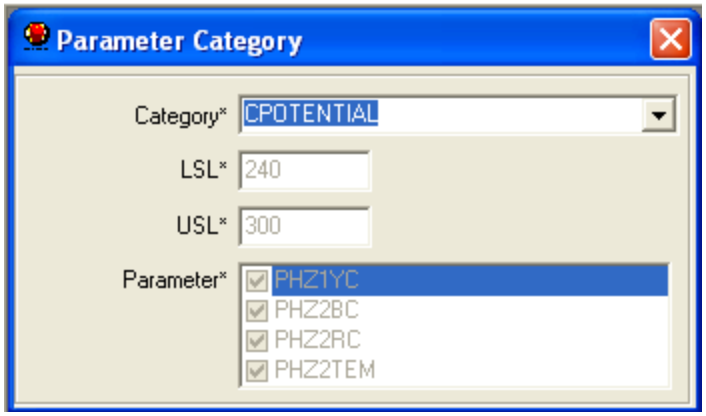


When g_HeatTreatment flag is true, in Configuration menu Zone sub menu will get visible.
When no data exist then system will enable Add button and disable Modify, Delete, navigation toolbar button.When data exist then system will enable Add, Modify, and Delete and navigation toolbar button.

When user clicks on Add button then system will set then focus on Zone Code. Disable Add, Modify, Delete button and enable Save, Cancel button. When user has entered code then before move to next system will check for duplication and same thing will check for Sequence No.

3.16 Parameter Category

Select **Configuration**| **Parameter Category** from the Main Menu to display the *Parameter Category* master. Use this option to define different parameter for a Parameter Category which has LSL and USL. This will be used for plotting chart of tray.



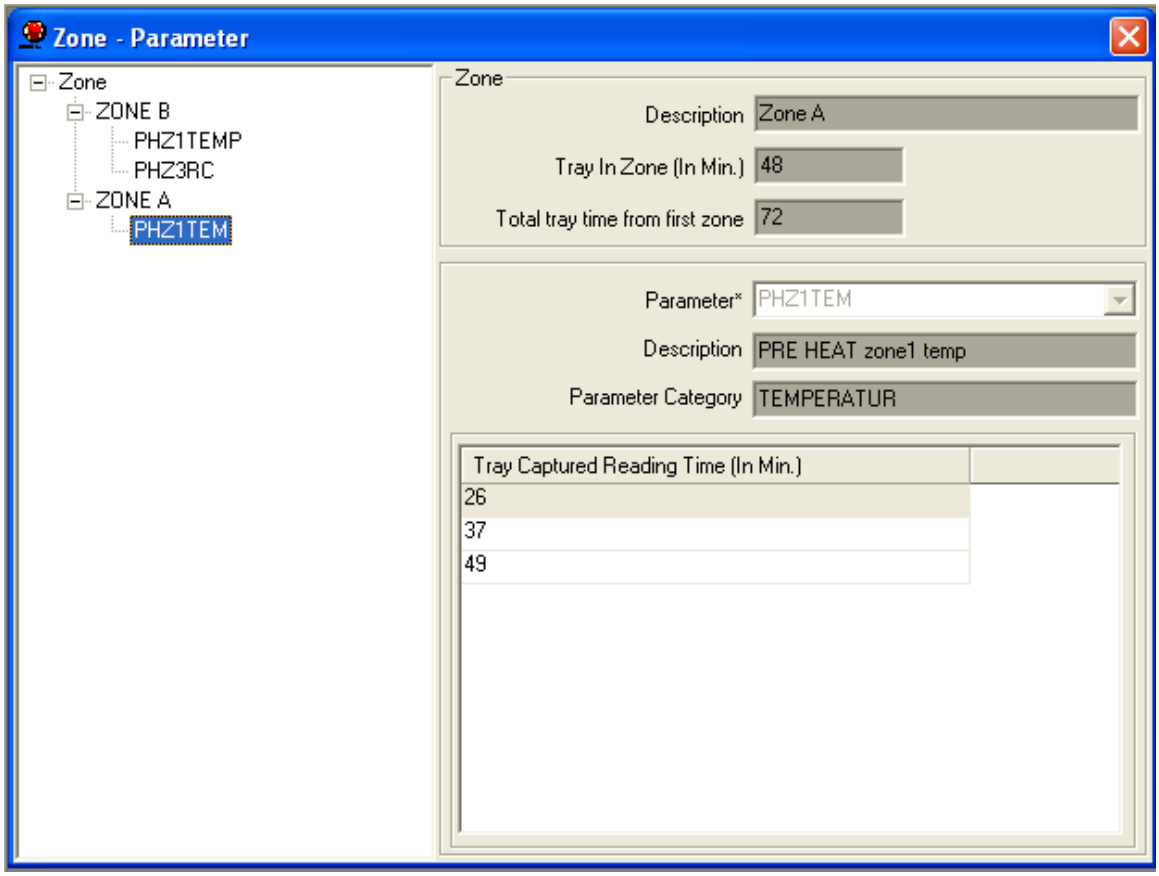
When g_HeatTreatment flag is true, in Configuration menu Parameter Category sub menu will get visible.

When no data exists, system will be enabled only Add button and disabled Modify, Delete, Navigation toolbar button. When data exists, system will be enabled Add, Modify, Delete and Navigation toolbar button.

When user clicks on Add button then system will set the focus on Parameter Category and will be disabled Add, Modify, delete button & enabled Save, Cancel button. When user has entered Parameter category then before move to next, system will check for duplication.

3.17 Zone Parameter

Select **Configuration| Zone Parameter** from the Main Menu to display the *Zone Parameter* master. Use this option to configure Zone, Parameters and its Captured Reading Time, which will use while plotting a chart.



When g_HeatTreatment flag is true, then in Configuration menu Zone Parameter sub menu will get visible.
When no data exist then system will show only Zone in a tree on left hand side and on right hand side display zone details like Description, Tray In Zone.
When data exist then system will display 1st Zone of 1st parameter details in a grid. Grid will show all entered Captured Reading Time. Structure of tree is as below.

Zone (Root Node)
Zone A
Para A
Para B
Para C
Zone B
Para D
Para E
Para F

When user has selected Zone (like Zone A, Zone B) then only Add button will get enabled. When User clicks on Add button, Save and Cancel button will get enabled and Add button will get disabled and then system will populate all parameter in a combo box, which was not assigned to zone. When user selects parameter or user can manually enter the parameter then system will display parameter description in respective textbox. Just

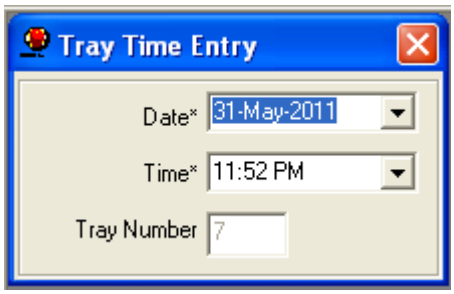
below parameter description system will provide the grid for entering tray captured reading time. At a time user can enter one time in a grid.

When user has selected Parameter (like Para A, Para B) then Add, Modify, Delete button will get enabled. When user clicks on Add/Modify button then Save, Cancel button will get enabled and add button, parameter combo box will get disabled. In case of Add button, system will set the focus on a new row of a grid. In case of Modify button, system will set the focus on selected row for modification.

While saving the record, system will do the validation for blank or zero, Same Captured Reading Time, Increment order for captured time etc for the zone. When user clicks on Delete button, system will delete the selected parameter and when user press 'Delete' button from keyboard of the selected row in the grid then selected Captured Reading Time for a zone-parameter will get deleted. If time is entered by the user which was already assigned for different parameter then system will display message 'Same Captured Reading Time has defined in parameter **PARA.'**

3.18 Tray Time Entry

Select **Configuration**|**Tray Time Entry** from the Main Menu to display the *Tray Time Entry* master. Use this option to configure Tray in Date, Time and Tray Number, which will use while plotting a chart.



When g_HeatTreatment flag is True, then in Configuration menu Tray Time Entry sub menu will get visible.
When no data exists then system will show blank combo box & textbox.
When data exist, Date, Time will display in combo box and text box will be use for displaying Tray Number.

In case of Add Mode, system will display date, time in Date Picker control for selection of date and time. On selection of date, system will increment the tray no for a date and it will display in Tray Number textbox.

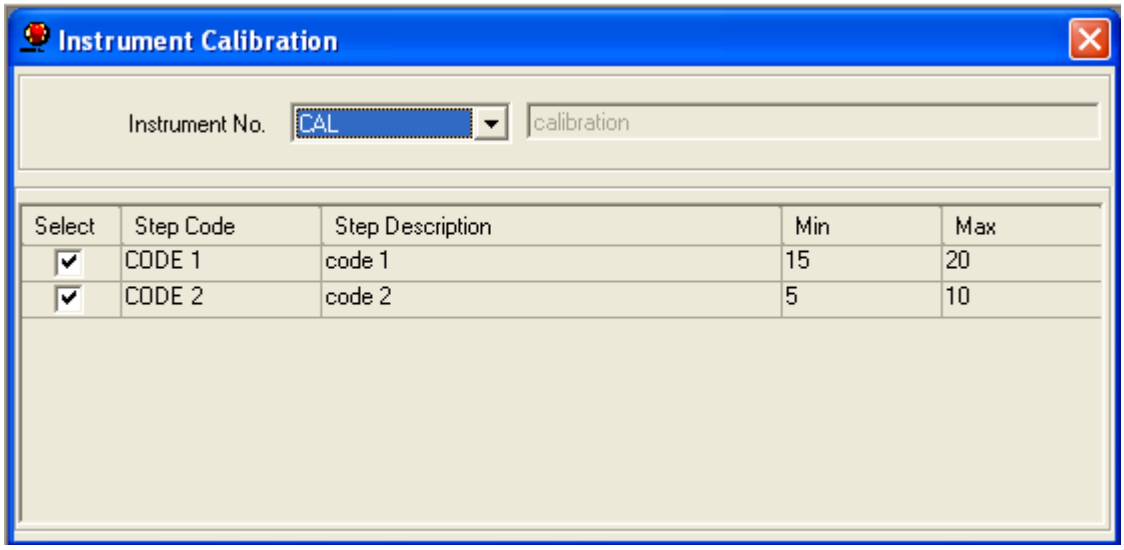
In case of Modify Mode, system will visible Date Picker control and set the focus on Time. User can modify time and tray number.

While saving a record a system will check duplication of record for date, time and duplication of tray no for a date. System will check blank or zero value for Tray No.

In case of Delete Mode, when user set the focus on date and try to delete the record then system will delete the record for selected date & Time.

3.19 Instrument Calibration

Select **Configuration|Instrument Calibration** from the Main Menu to display the *Instrument Calibration* master. Use this option to add different Instrument No, Cal Step Code, LSL, and USL for creating relationship of Instrument with Calibration Step Code with LSL & USL.



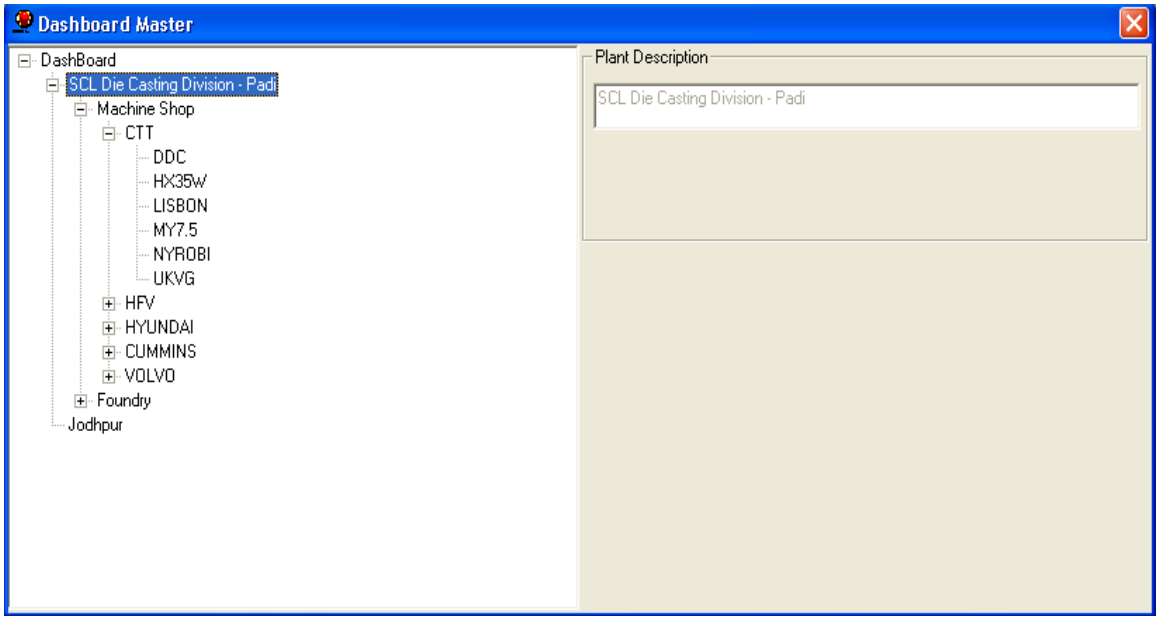
Click **Add**, to add new record. Modify, Delete, button will get disabled & save, cancel button will get enabled and All Calibration step code gets loaded into grid.

Click **Save** button i.e Add, Modify, Delete button will get enabled & Save, Cancel button will get disabled and all Calibration step code that has checked or selected along with its LSL, LSL value for selected instrument will get saved.

Click on **Modify**, to modify an existing record i.e. Add, Delete, button will get disabled & save, cancel button will get enabled and All calibration step code along with entered LSL, USL will get display so that user can enter or change the LSL, USL value.
Click **Delete** button. Add, Modify, Delete button will get enabled & Save, Cancel button will get disabled and system will check that instrument no is used in History calibration or Not, if Not then delete the Instrument No from Instrument Calibration Master if instrument no is used then display the message "Cannot Delete. Record exists in Gauge Calibration"

3.20 Dashboard Master

Select **Configuration|Dashboard Master** from the Main Menu to display the Dashboard master. Use this option to define various plants, Divisions, Units and Location/Cells.



Using Tree control, following hierarchy will be created.

- Plant
- Division
- Unit
- Location/Cell

User should select Dashboard to add Plants.
Click on **Add**, display in right hand side - Plant description.
When user click on save display first node is Plant. Disable the Plant description.
User selects the Plant to add the Division.
User selects the Division to add the Unit.
User Select the Unit to add the Location/Cell.
Display List Box in the RHS Side for the selection of Location/Cell.

- ❖ User cannot delete any node if it is referred in the User Detail.
- ❖ If user tries to delete Plant, which has defined Divisions, Units and Cells and if it is not referred in the User Detail ask for the confirmation for Deletion. If user Press 'Yes' display message 'There are divisions defined! Are you sure you want to delete this record?' If user press 'Yes' selected Plant will get deleted along with Division, Units and Cells.

- ❖ For Modifying Plants or Divisions or Units, user can select and click on Modify. Text box of Plants Description will get enabled so that user can modify. After modifying, user can click on Save to modified the record.

If Cell/Location is assigned to user and then user try to modify the Location/Cell display the message as 'Cannot Modify, Record exists in Assign Dashboard Level to User'.

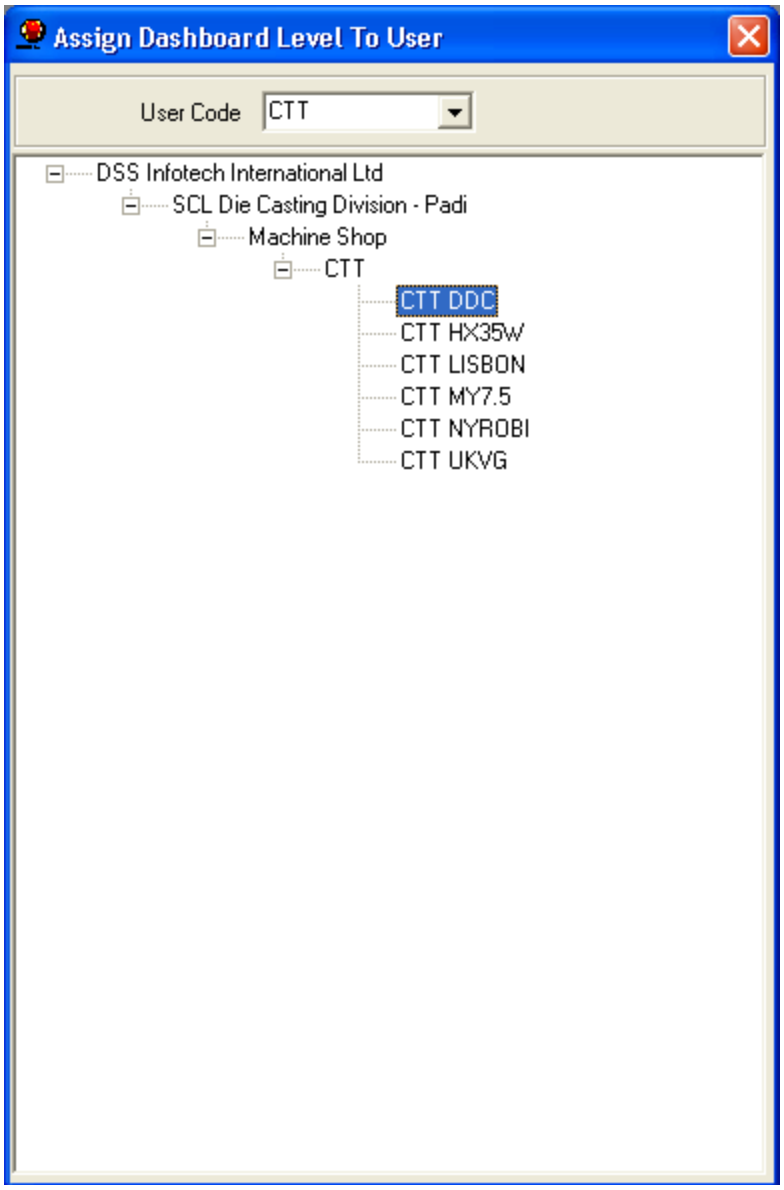
If Cell/Location is not assigned to user and user try to modify the Location/Cell and Cells are available for assigning to Units, display the other cells with selected cells in RHS side. User try to select multiple cell then display the message 'Multiple selection is not allowed in modify mode'. User has to uncheck the selected or earlier one and select the other cell to modify the Cell and click on save to modify the record.

If user clicks on add for adding the Cell/Locations and No cells are present to add in unit then system should display the message as 'No location left to add'.

Plants, Divisions, Units and Cell/Location cannot be same. Same Plant description cannot be defined as Units or Divisions.

3.21 Assign Dashboard level

Select **Configuration|Assign Dashboard Level** from the Main Menu to display the **Assign Dashboard Level**. Use this option to assign the dashboard level to user.



Display combo Box for the user selection.Display Tree control to assign the levels of the user. When user selects the parent node then automatically child node should get selected. If Child node is selected then automatically Parent node should get selected.

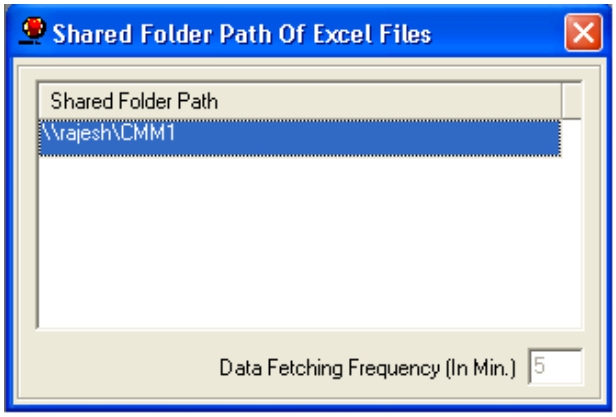
User can assign i.e. add dashboard level to users, modify the Dashboard levels and can be deleted the levels of user.

In View mode, tree will display without check box so that user can see the complete tree by click on '+' or '-'.
In Add, Modify mode, tree will display with check box so that user select or deselect the tree node.

In Modify mode, new tree i.e complete dashboard will get display of which those are assign to user get checked & rest of them are unchecked.

3.22 Shared Folder Path of Excel Files

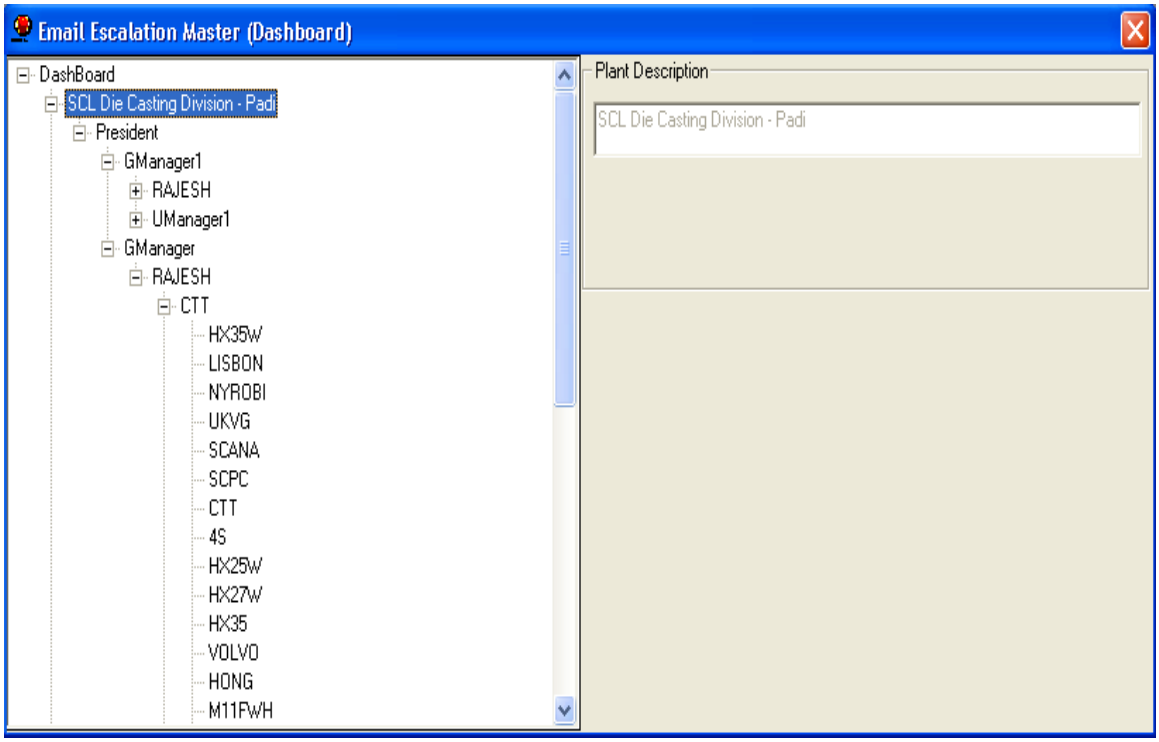
Select **Configuration| Shared folder path of excel files** from the Main Menu to provide details about the path of Excel or CSV files.



System will provide the grid for entering record for Share folder & test box for Data Fetching Frequency (In Min).
When no record found in database then only Add button will get enabled.
If record exists then Add, Modify and Delete button will get enabled.
If user wants to modify the record then user has to select the record in a grid and modify it & then click on save button.
If user wants to delete the record then user has to select the record in a grid and then click on delete button.
If user wants to add even if record exists then user has to click on Add button, then system will show all entered record in a grid & add one blank row at the end to select the share folder path. By click on save button, record will get saved and data fetching frequency will have earlier value which user had entered.

3.23 Email Escalation Master (Dashboard)

Select **Configuration| Email Escalation Master** from the Main Menu to create Email Escalation hierarchy like President, General Manager and Unit Manager and then assign unit to Unit Manager.



Select **Plant.** Click on Add for assigning President. User can see on right pane all users which has category President. User can click on Check box to select the president and click on Save.

Select **President**. Click on Add for assigning General Manager. User can see on right pane all users which has category General Manager. User can click on Check box to select the General Manager and click on Save.

Select **General Manager**. Click on Add for assigning Unit Manager. User can see on right pane all users which has category Unit Manager. User can click on Check box to select the Unit Manager and click on Save.

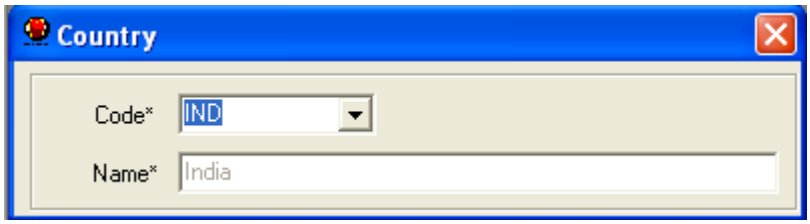
Select **Unit Manager**. Click on Add for assigning Units. User can see on right pane all Units which are assigned in the Dashboard master. User can click on Check box to select the Units and click on Save. After assigning Unit system will show all those cells which are assigned in the Dashboard.

Screen has Add, Modify and Delete option for President, General Manager, Unit Manager and Unit. User cannot add, modify or delete Location or Cell node.

User can add President by selection of Plant (Parent), which is populated on right side of list box, which is populated from contact user screen, which have ‘President’ category. User can add multiple presidents.

3.24 Country

Select **Configuration|Country** from the Main Menu to display the *Country* master. Use this option to define various countries.



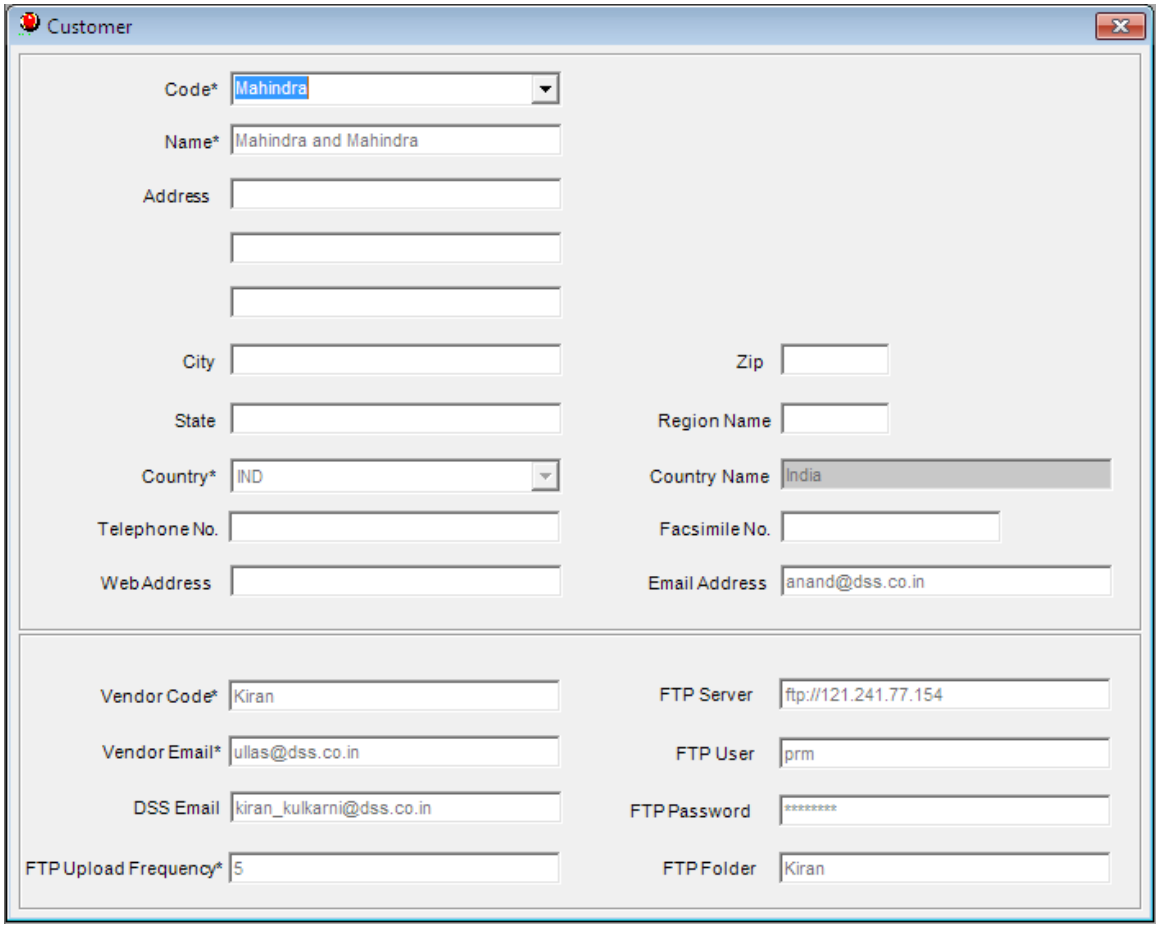
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Country code.
- **Name** – The name of the Country.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record.You can delete a country only if it is not used in the *Customer* master.

3.25 Customers

Select **Configuration|Customers** from the Main menu to display the *Customer* master. Use this option to enter details of the different customers.



Click **Add** to add a new entry. Enter the following details:

- **Code** – The Customer code.
- **Name** – The name of the Customer.

Enter the following additional information about the Customer:

- **Address**
- **City**
- **Zip**
- **State**
- **Region Name**
- **Country**
- **Country Name**
- **Telephone No.**
- **Facsimile No.**
- **Web Address**
- **Email Address**

Application will display following fields at the bottom of form, when g_WebDashboard flag is on.

- Vendor code

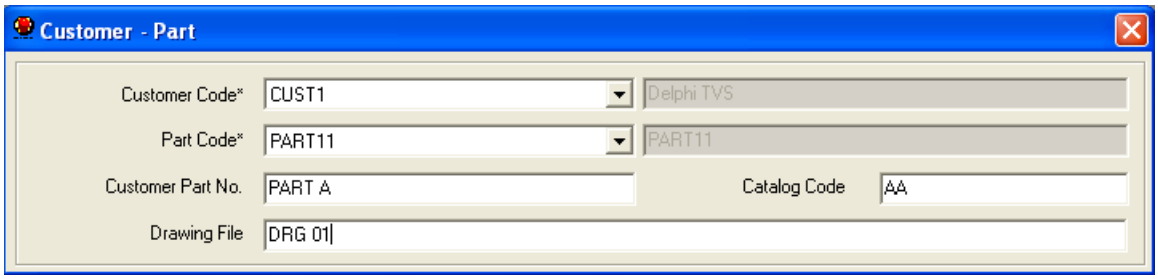
- FTP Server
- Vendor Email
- FTP User
- DSS Email
- FTP Password
- FTP Upload Frequency
- FTP Folder

Above fields will be used for the Vendor service to upload the data on FTP for the customer.
Vendor Code will be used while creating the XML file. Vendor Email, Customer Email and DSS Email will be used when some error occurred while uploading file on ftp or while making connection to database etc. FTP Server, FTP User, FTP Password and FTP Folder will be used to connect to FTP of customer. FTP Upload Frequency (i.e. in Minute) will be used when the XML will be created and uploaded on FTP.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a customer only if that code is not used in the *Customer Part* master

3.26 Customer Part

Select **Configuration|Customer-Parts** from the Main Menu to display the *Customer Part* screen. Use this option to maintain the **Part Code** used by the **Customer** for a part defined in the *Part* master. The Customer and Part relationship is used for the *Work Order analysis report*.



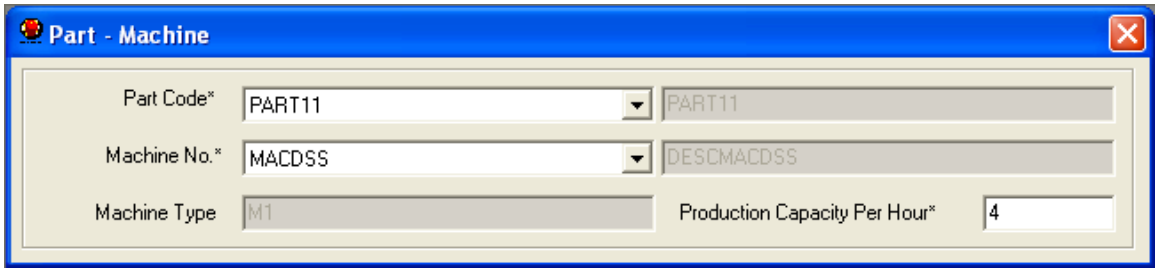
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Customer code.
- **Name** – The name of the Customer.
- **Part –** The Part Code defined in the *Part* master.
- **Description** – The description of the part.
- **Customer Part Number –** The code used by the customer to identify the part.
- **Catalog Code** – The catalog code of the part.
- **Drawing File** – The drawing file of the part.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record.

3.27 Part Machine

Select **Configuration|Part-Machines** from the Main Menu to display the *Part-Machine* screen. This screen contains information from the *Part Master* and *Machine Master*. This is used most frequently at the time of generation of reports. You can then gauge the performance of the part and the machine and the capacity of materials it produces per hour.



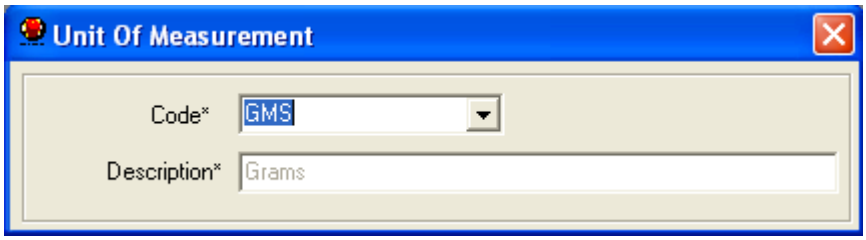
Click **Add** to add a new entry. Enter the following details:

- **Part Code –** The Part code.
- **Part Description –** The description of the part.
- **Machine Number –** The Machine number.
- **Machine Description –** The description of the machine.
- **Type** – The type of machine.
- **Production Capacity Per Hour** – The capacity of material the machine produces per hour.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record.You cannot delete the Part-Machine relationship if a Job exists for it.

3.28 Unit of Measurement

Select **Configuration|Unit of Measurement** from the Main Menu display the *Unit of Measurement* master. Use this option to enter the different Units of Measurement.



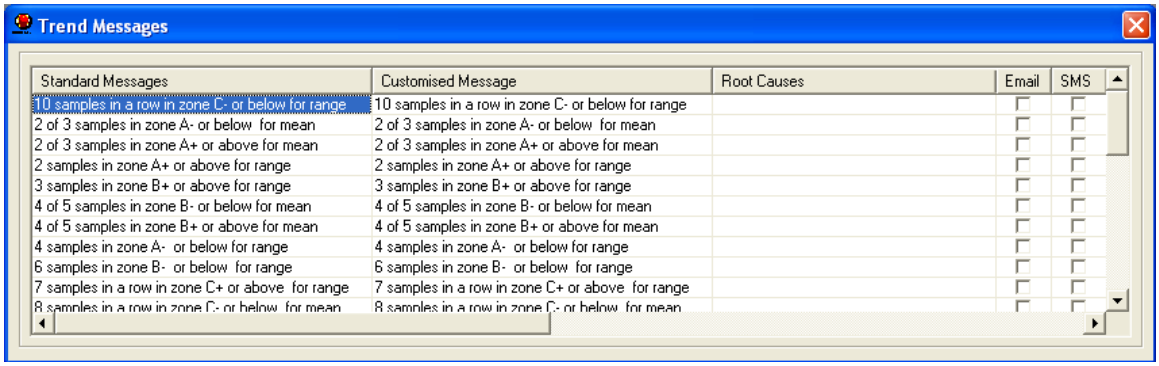
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Unit of Measurement code.
- **Description** – The description of the Unit of Measurement.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a unit of measurement only if it is not used in the *Standard Quality Assurance Plan* for defining of a parameter.

3.29 Trend Messages

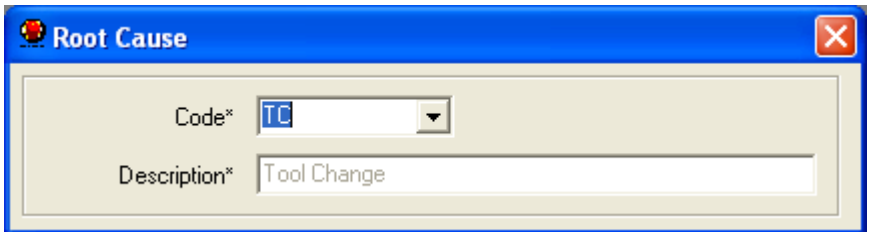
Select **Configuration|Trend Messages** from the Main Menu to display the *Trend Messages* screen. Use this option to map Standard Messages with Customized Messages for the Trends raised. These Customized Messages are displayed when trends are raised in the *Measurement* screen.



All messages from the *Trends* table are displayed on screen. Initially the **Customized Message** is displayed from the **Standard Message** and **Root Cause** is blank. Select **Root Cause** from the drop down list which is displayed from the *Root Cause* Master.
Click **Save** to save changes to **Customized Messages** and **Root Causes**. Standard Messages cannot be modified.

3.30 Root Cause

Select **Configuration|Root Causes** from the Main Menu to display the *Root Cause* screen. Use this option to enter Root Causes which are used in the *Corrective Action* screen.



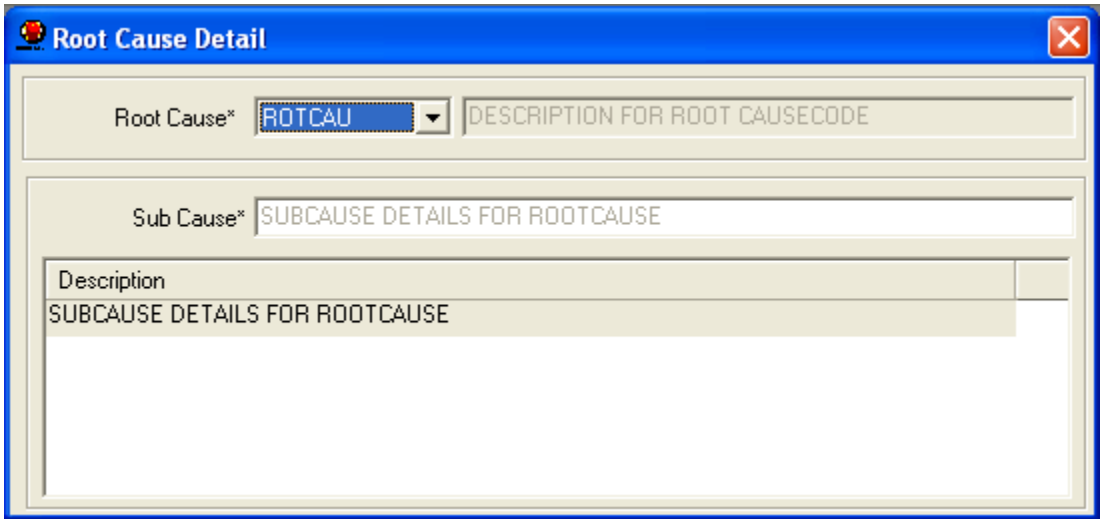
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Root Cause code.
- **Root Cause** – The description of the Root Cause.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a root cause if is not used in *Corrective Action* screen.

3.31 Root Cause Detail

Select **Configuration|Root Cause Detail** from the Main Menu to display the *Root Cause Detail* screen. Use this option to define sub causes for root causes defined in the *Root Cause Master*. This master is used in the *Tool Life Monitoring Module*.



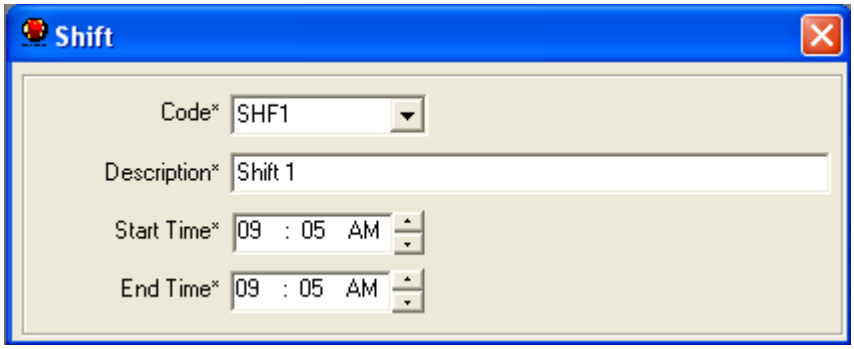
The **Root Cause** codes defined in the *Root Cause* master are displayed in the **Root Cause** drop down list box. Select the required code.
Click **Add** to add a sub cause. Enter the following details:

- **Sub Cause** – The Sub Cause code.
- **Description** – The description of the Sub Cause.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record.

3.32 Shifts

Select **Configuration|Shifts** from the Main Menu to display the *Shifts* screen. Use this option to enter details of the shifts in which users of the system log on.



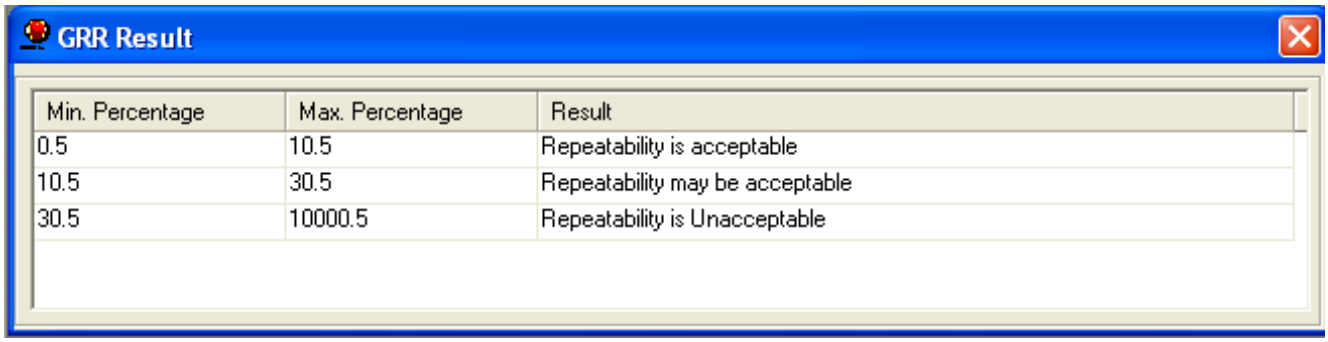
Click **Add** to add a new entry. Enter the following details:

- **Code** – The Shift code.
- **Description** – The description of the Shift.
- **Start Time** – The time the Shift begins.
- **End Time** – The time the Shift ends.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You can delete a shift if it is not used in the *Production* screen or the *Model Shift* screen.

3.33 GRR Result

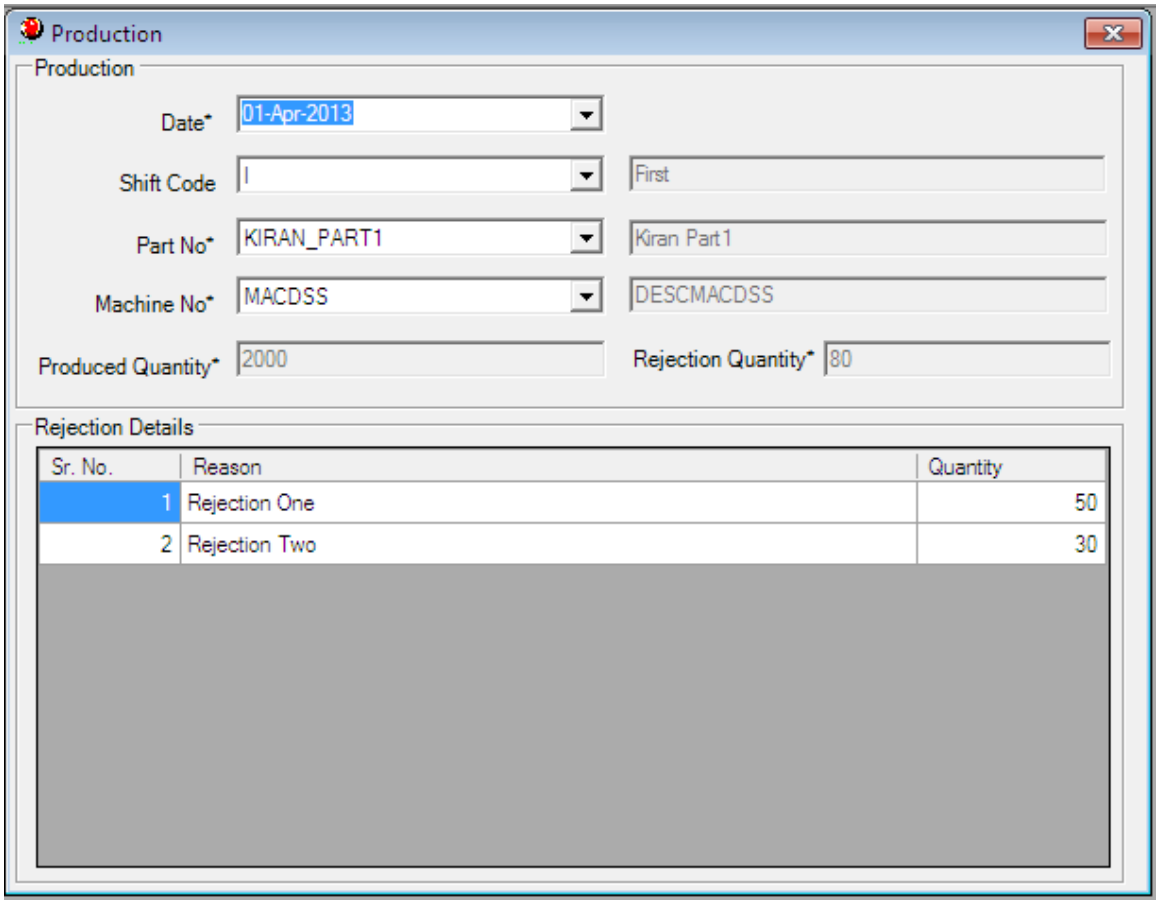
Select **Configuration|GRR Result** from the Main Menu to display the *GRR Result* screen. Use this option to configure GRR Result based on Min & Max Percentage.



This form has only Modify mode option. On Modify operation, user can modify the default data as per their requirement.
User has to enter the data in such a way that Max Percentage should be greater than Min Percentage and also Min Percentage of current should be greater than or equal to earlier Min/max Percentage.

3.34 Production

Select **Configuration|Dashboard Production** from the Main Menu to display the *Production* screen. Use this option to enter and validate data required of the production for web dashboard.



The Objective of the Production unit is to enter and validate data required of the production for web dashboard. User enters the data for Produced Quantity, Rejection Quantity and reasons for Rejection Quantity for date, shift, part and machine number combination.

Click **Add** to add a new entry. Enter the following details:

- **Date** – Default System Date.
- **Shift No** – Select from the drop down box with respective values from masters.
- **Part No** – Select from the drop down box with respective values from masters.
- **Machine No** – Select from the drop down box with respective values from masters.

After selection of machine no, Produced Quantity is calculated and displayed in Produced Quantity field. After entering all details, user can save record on validation of all fields.

On **Modify** record, all controls are disabled except Rejection Quantity, Quantity column of the grid from rejection details frame and Produced Quantity. User can select date, shift, part no and machine no for search and navigation of record.

On **Delete** record, user can delete record after the confirmation message.

4 Quality Planning

4.1 Standard QAP

A standard QAP stands for Standard Quality Assurance Plan, which basically means a quality plan to achieve the quality standards that are defined and followed during the manufacturing process for the part.

Quality Assurance Plan – This is planning the quality standards for a part to be manufactured. This may be done at three levels:

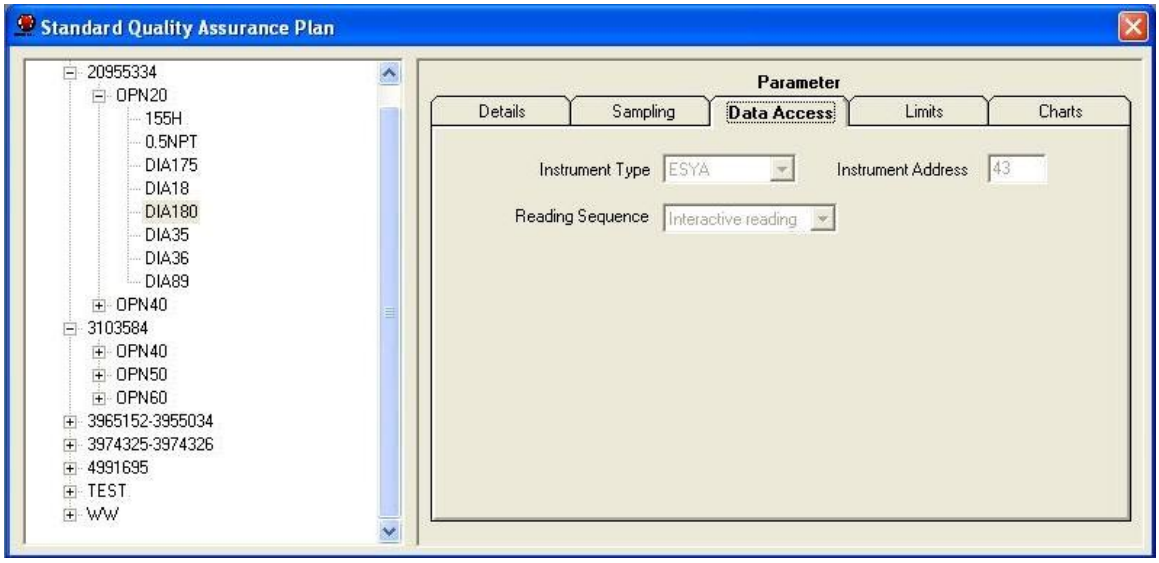
1. The details of each part for which the quality plan will be made and implemented.
2. The details of each process that can be associated with a specific part.
3. The details of each parameter that may be associated with a specific part and the process.

It is expected that you know the following concepts before initiating the quality assurance plan:

- Part
- Process
- Part parameter
- Unit of Measurement
- Instrument

The *Standard QAP* screen has three parts viz. define Part, define Process and define Parameters for the Process. You can use the facility to copy details from one part of the QAP to another.

For selected instrument type has instrument interface is ‘ESYA’ then Instrument Address label & text box will get visible otherwise it will be invisible. User can enter the Address of the instrument i.e. in digit. Instrument Address can not be blank.
Software will use this instrument address for collecting the data from the Esya Instrument.



Copying Details:
Use this facility to copy details from one part of the Standard Quality Assurance Plan to another. You may copy information related to parts, processes or parameters. This will prove useful in case of similar items. The Standard QAP can be defined in a shorter time. Select an item from the tree structure defining the Standard QAP. Use the right click button of the mouse. Select **Copy**. Then select the appropriate part or process to which it is to be copied. Right click the mouse once more. Select **Paste**. The details get copied. You may make changes as required.

Cloning Details:

Cloning facility can be carried out at all levels that are Part, Process, and Parameter level. If the user selects the Part/Process/Parameter and right clicks, clone menu is displayed to the user. If the user clicks on clone menu option a new screen with the title Select Part/Process/Parameter is displayed to the user. User can select one or more Part/Process/Parameter and click on OK Button. The Part/Process/Parameters that are selected will have the same specification of the Part/Process Parameters that was selected in Standard QAP screen. Cloning will be done only within Part, Process and Parameter.

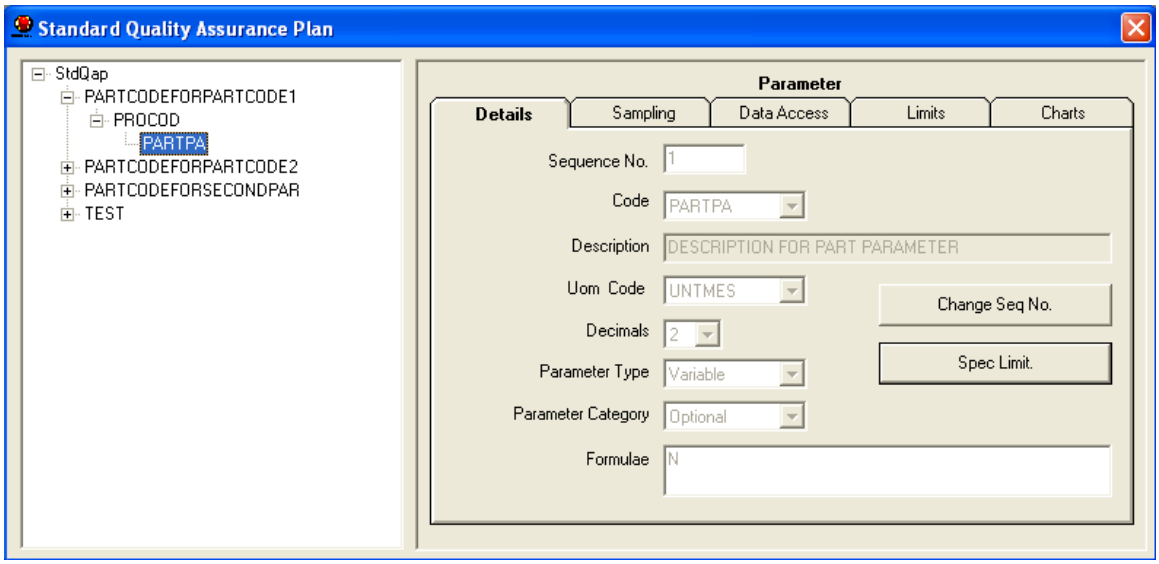
To Modify or Delete records:
Select an item from the tree. It may be a part, process or parameter. Click **Modify** to modify details. Information related to the selected item can be modified. Click **Save** to save changes. Click **Delete** to delete the selected item.

4.1.1 Defining a Part in Standard QAP

For defining a new Part, select Root node i.e. StdQap, Click on the Add toolbar button or menu item. Part combo will be displayed with the distinct part codes from Part screen. Select part, Description Textbox will display part name for the selected part. Process combo will be enabled. Process combo will be displayed with the processes from Process screen but with only those, which are not yet attached to that part.
Select process. Prepared By field will display the logged in user. Save the record. After saving the record, Part and process defined will be added to tree view .On selection of a particular process their details will appear in Right Hand Side of the details screen.

4.1.2 Defining a Process in Standard QAP

Select **Quality Planning|Standard Quality Assurance Plan** of the Main Menu to display the *Standard Quality Assurance Plan* screen.

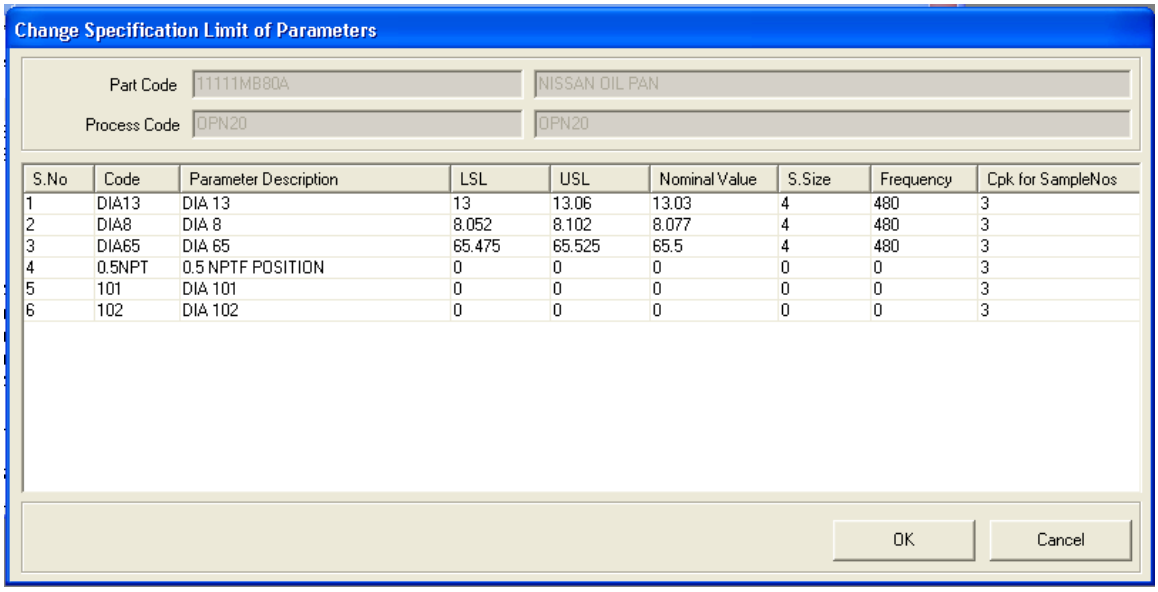


On the left side of the screen, the complete Standard QAP is displayed in a tree structure (With Parts→Processes→Parameters). On the top, the word "**StdQAP***"* is displayed.You may expand or collapse the tree at any level by clicking on that level.
To add a **Part,** click on "**StdQAP"**. Then click **Add.** Enter Part and Process Details on the left side.
To add a **Process,** click on the Part Name in the tree. Then click **Add.** Enter Process Details.
Click **Save** to save records.

In **Change Sequence** of Parameters Screen - Provide one more column of Mapped Sequence in case of Bilcare. User can modify the sequence number of parameters through this screen.

Specification Limits -The engineering requirement for judging acceptability of a particular characteristic. A specification is never to be confused with a control limit. Ideally specification ties directly to or is compatible with the customer's requirements or expectations. User can modify LSL, USL, Nominal value, Sample size and Frequency of more than one parameter through this screen.

When user click on Specs Limit button then Change Specification limit screen will get display.
Instrument address column get visible only in the grid for process-parameter having interface code is 'ESYA'. User can see all parameters instrument address through this screen.
Cpk for Sample No's should not be blank but can be zero.



S.No	Code	Parameter Description	LSL	USL	Nominal Value	S.Size	Frequency	Cpk for SampleNos
1	DIA13	DIA 13	13	13.06	13.03	4	480	3
2	DIA8	DIA 8	8.052	8.102	8.077	4	480	3
3	DIA65	DIA 65	65.475	65.525	65.5	4	480	3
4	0.5NPT	0.5 NPTF POSITION	0	0	0	0	0	3
5	101	DIA 101	0	0	0	0	0	3
6	102	DIA 102	0	0	0	0	0	3

4.1.3 Defining Parameters for the Process

The process quality and the behavior are determined by monitoring the values of the parameters that influence the quality of the part being manufactured. These may be set at parameter level.
To add a **Parameter,** click on the Process Name in the tree. Then click **Add.** Enter Parameter Details.
You may click on the **Parameter Code** dropdown list to select a parameter code, and select Unit Of Measurement that will be used for measuring from **UOM Code** dropdown list. You may then select the type of parameter, **Attributive** or **Variable**, from the **Parameter Type** group box. Similarly, the category, **Optional** and **Critical** may be decided and selected from the **Parameter Category** group box.

You also have to enter the following information while defining a Parameter.
Sampling

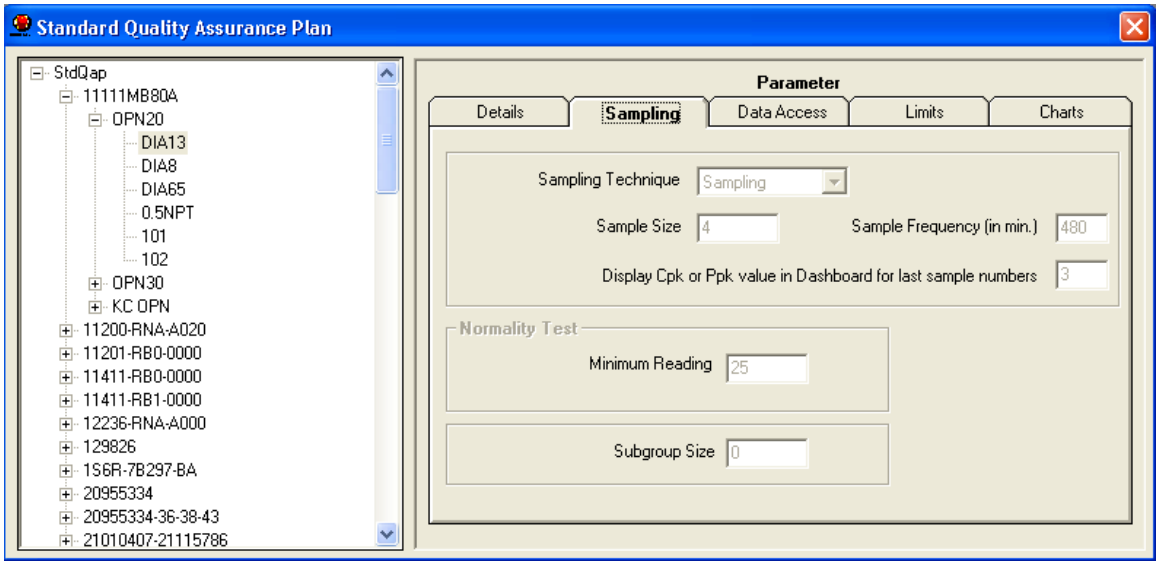
Data Access

Limits

Charts

4.1.4 Sampling

The screen below displays **Sampling Tab Sheet** for Process, Parameter selected.



You may set size of the sample for quality measurement in the **Sample Size** text box. You may also specify how frequently sample size may be collected in the **Sample Frequency** text box.

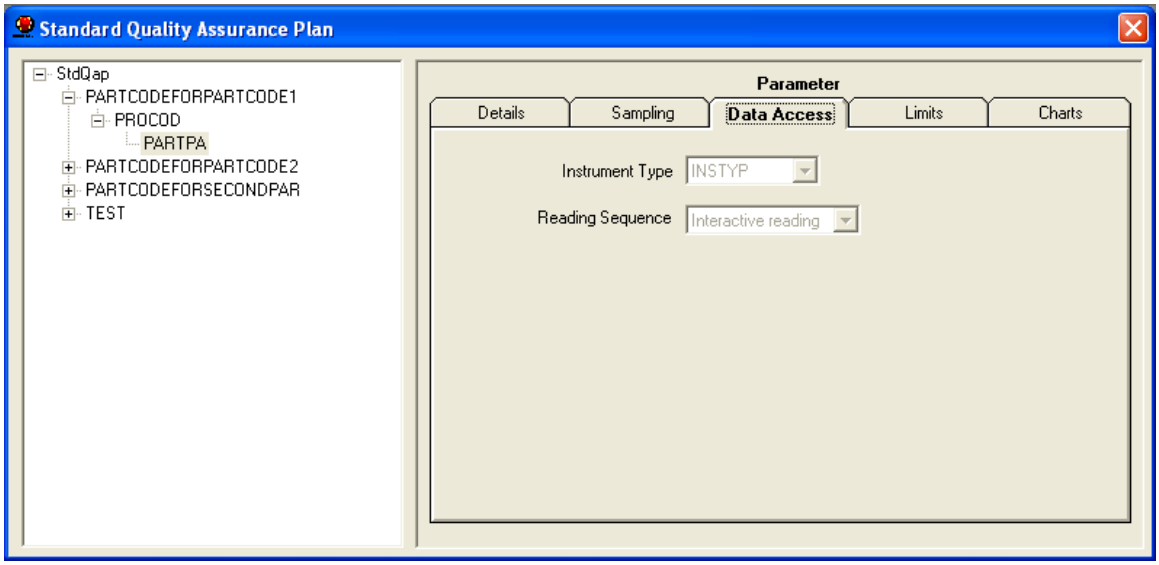
The manufactured parts may undergo either **100% Inspection** or you may choose to do **Sampling** for the measurement of quality. This may be chosen from the **Sampling Technique** group box. You may select either **Sampling** or **100% inspection.**
If the Parameter Type is Variable, enter the Minimum Reading.
The default value is 125. It may be changed but must be greater than zero.
This value is used for the Chi Square (Normality) Test.

Field 'Display Cpk or Ppk value.' added to know the system to calculate Cpk or Ppk based on the last sample numbers, if user enter 0 (zero) then system will calculate the Cpk or Ppk based on all sample. If user put the sample no 20 then system will calculate for last 20 samples.

If Attributive option is selected in the **Parameter** tab then you have to enter the **Subgroup Size**. If subgroup size is not fixed, 0 can be entered in **Subgroup Size** text box

4.1.5 Data Access

The screen below displays **Data Access Tab Sheet** for Process, Parameter selected**.**



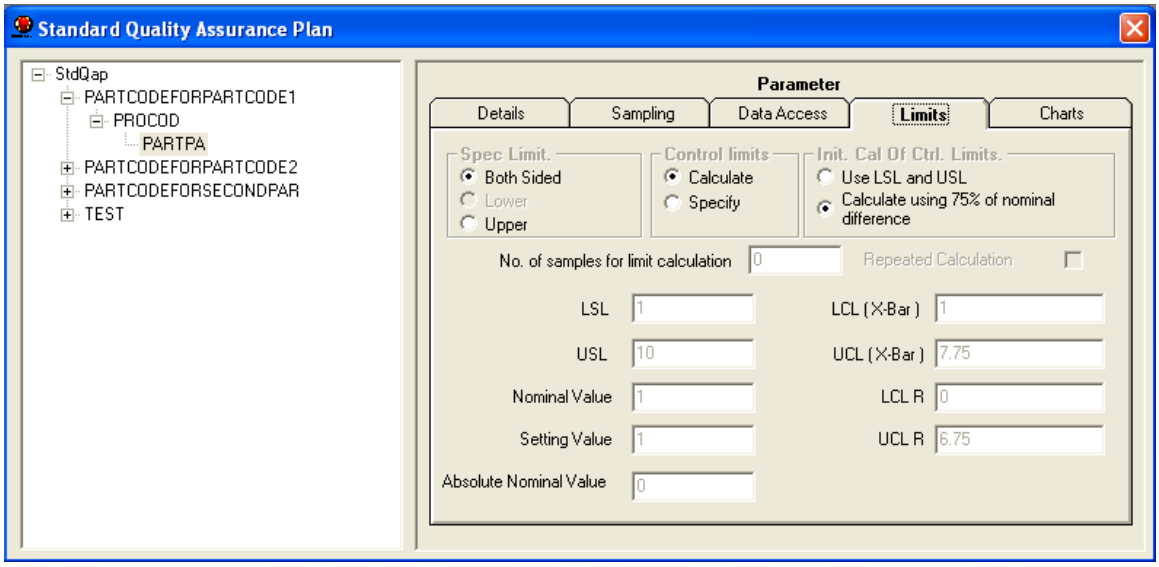
The **Instrument Type** used for the data access may be set from the drop down list on this tab along with the method used for the reading. You may take the readings automatically, which is a **Continuous** process, or by **Interactively**. This may be set in the **Reading Sequence** group box.

ELGI Instrument –

When instrument type has interface ELGI then system will display Instrument address in Data Access tab.

4.1.6 Limits

The screen below displays **Limits Tab Sheet** for Process, Parameter selected**.**



Specification limits, control limits and information related to limits are entered in this page.

Select option from **Specification Limits** group box.
Both Sided – Parameter considers both LSL and USL
Lower – Parameter considers only LSL
Upper – Parameter considers only USL

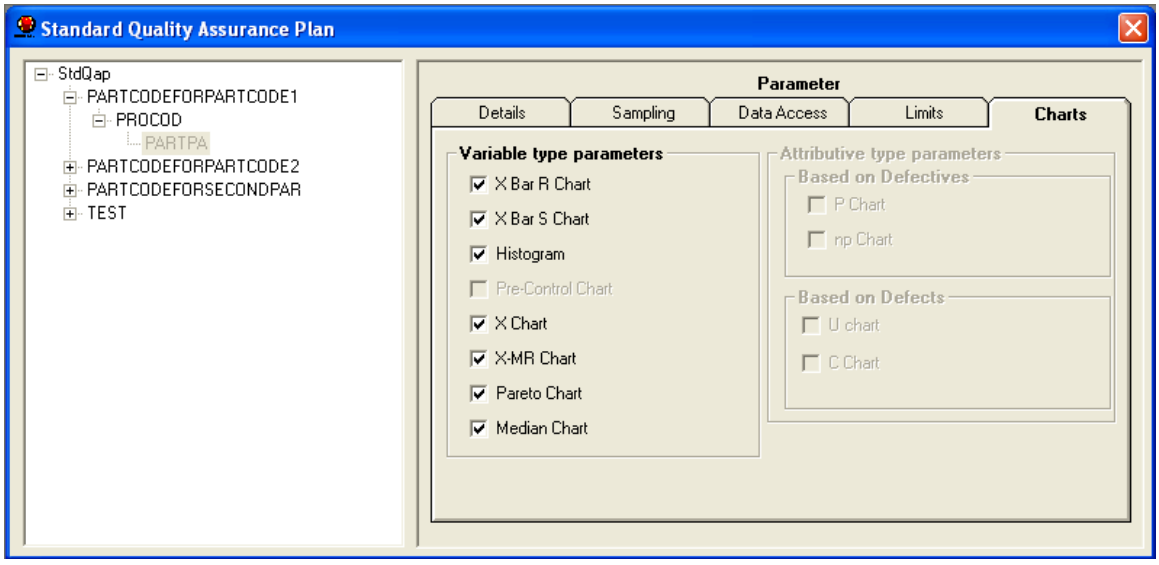
Select option from **Control Limits** group box.
Calculate – Select this option if you want the control limits to be calculated by the system.
Specify – Select this option if you want specify the control limits.

If **Calculate** option is selected then select option from **Initial Calculation Of Control Limits** group box.
Use LSL and USL – Select this option if you want the Specification Limits to be considered as the initial control limits.
Calculate using 75% of nominal difference – Select this option to control limits to be calculated on the basis of 75% of the Nominal difference. See also - Formula used for calculation of control limits.

The **No of Samples needed for the Limits Calculations** may be set here. If you want the control limits to be calculated repeatedly then you may check in the **Repeated Calculation** edit box. **Nominal Value** and **Setting Value** is also set here.

4.1.7 Charts

The screen below displays **Charts Tab Sheet** for Process, Parameter selected**.**



You may set on this tab the type of control charts you would like to draw. Depending on the type of parameters you have set on the **Parameter** tab. You may select and use the following chart types from the **Variable Type Parameters** group box.

- X Bar R chart
- X Bar S chart
- Histogram
- Pre-control chart
- X chart
- X MR chart
- Pareto Chart
- Median Chart

If **Pre-Control Chart** is selected then all other options get disabled and **Best Sample** will be displayed if **Lower** option has been selected under **Limits** tab. If any one of the above-mentioned charts is selected then **Pre-Control** option is disabled. **Best Sample** field will not be displayed.

Similarly following are the chart types for the **Attributive Type Parameters**

- P chart
- nP chart
- U chart
- C chart

Depending on the **Subgroup Size** you have set on the **Sampling** tab, attributive charts will be enabled for selection i.e. For Attributive type of parameter, **P chart**, **nP chart**, **U chart** and **C chart** can be selected. If **Subgroup Size** is greater than 0 then all options are

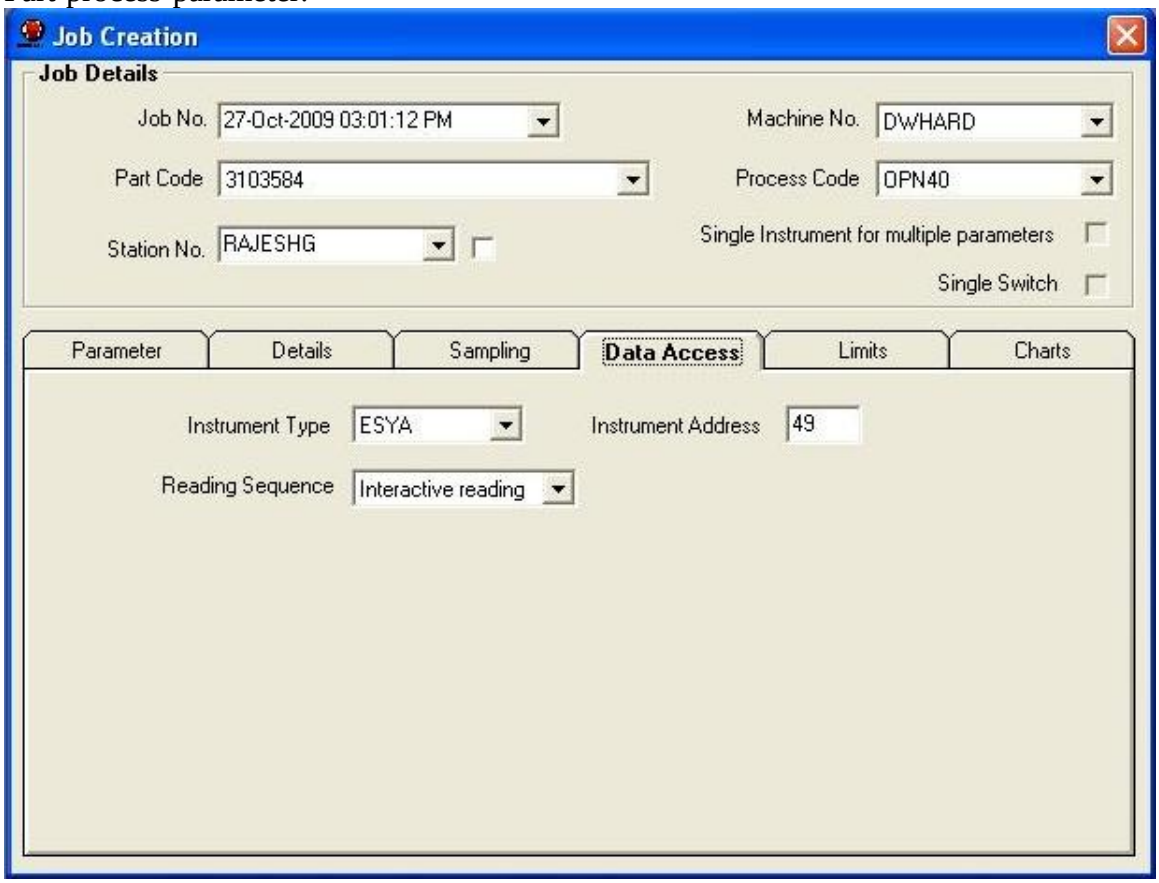
available. If **Subgroup Size** is 0 then only **P Chart** and **U Chart** options are enabled. **P** and **nP** charts fall under '**Based on Defectives**' group. While **U** and **C** chart fall under '**Based on Defects**' group. In **Charts** tab, if one/both options, under one group is selected then options under the other group will be disabled.

5 Process Monitoring

5.1 Job Creation

Select **Monitoring**|**Job Creation** from the Main Menu to display the *Job Creation* screen. Use this screen for the following:
To **create a Job and Work Order** simultaneously.
To **modify the QAP details for a parameter** of a job provided no reading has been taken.
To **delete a Work Order, a Job or a Parameter** of a job provided no readings have been taken.

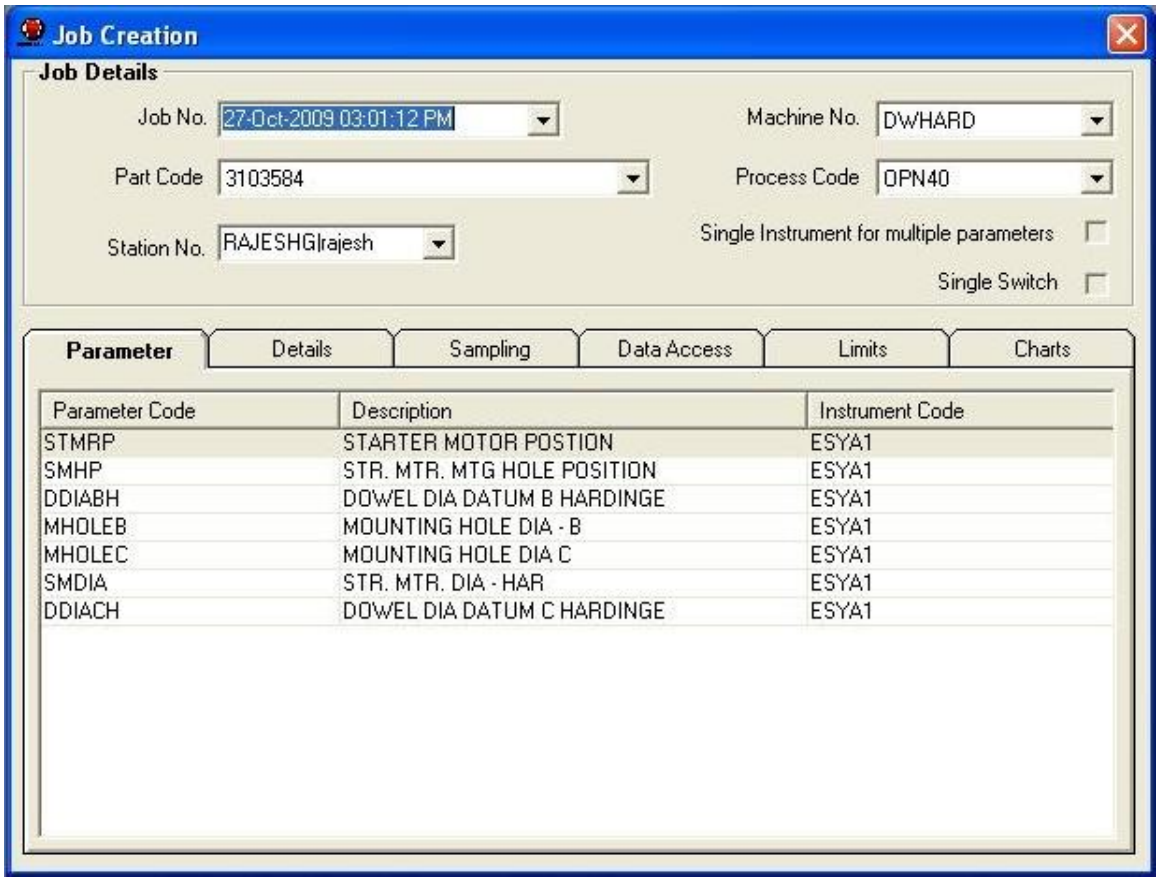
Interface code for selected instrument type is 'ESYA' then Instrument address will get visible.
When user selects the instrument is of type 'ESYA' then system should attach same instrument for all parameters.
While creating a job, Instrument address value will come from QAP for respective Part-process-parameter.



If Windows user is True from Configuration file then Job will get created with Station No

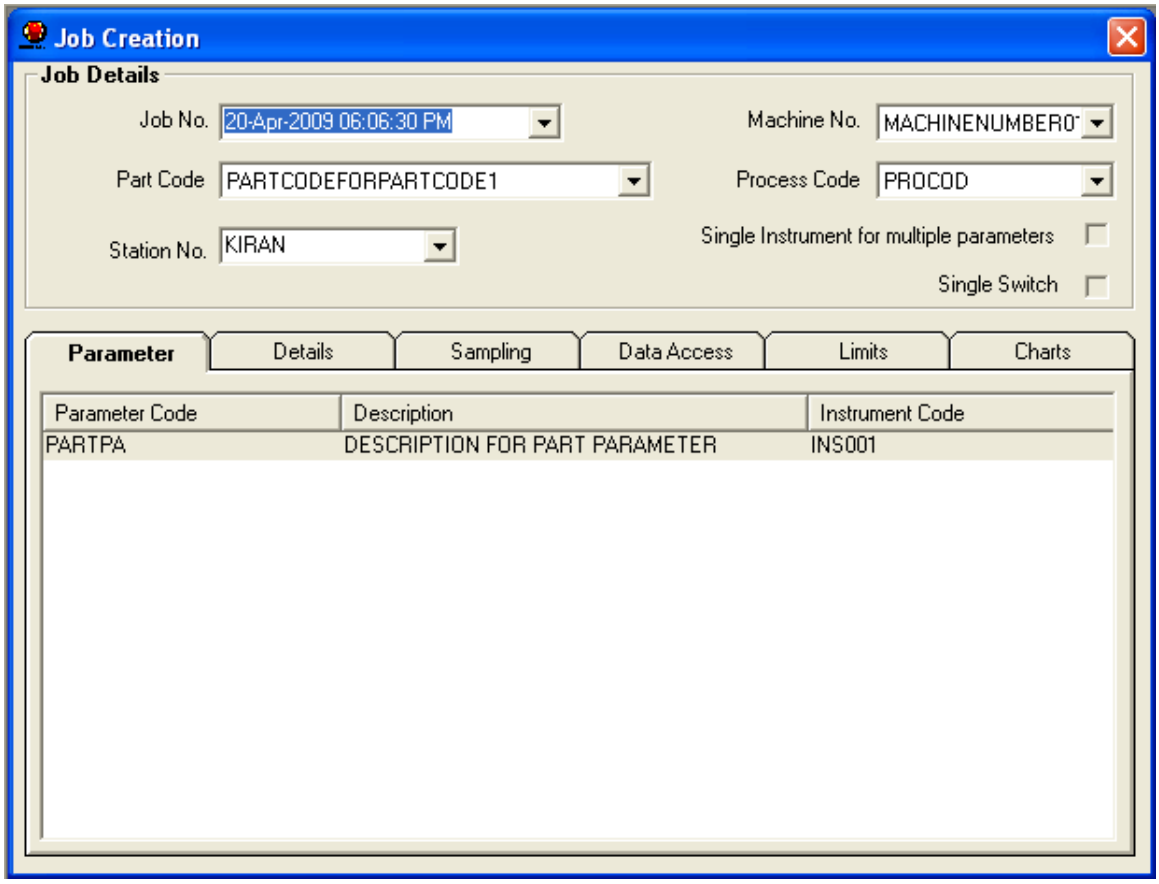
which is equal to StationNo (PC Name) plus Windows User otherwise Job will get created with Station No (PC Name).

ELGI Instrument –
In job creation screen when user attach instrument for a parameter which has instrument type of interface is ELGI then system attach same instrument for all parameter of Instrument Type has interface ELGI.



5.1.1 Creation Of Job And Work Order

To create a new job, click **Add.** The *Parameter* tab is active.

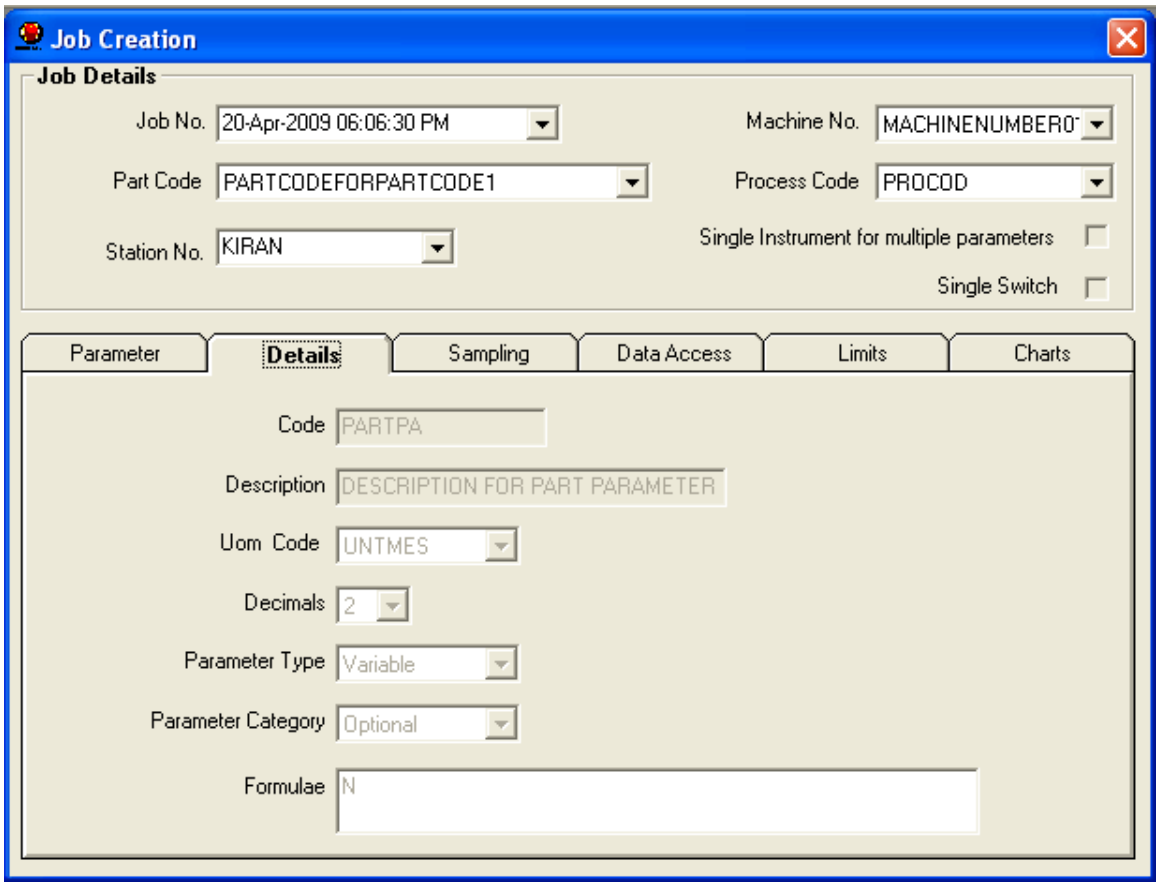


Job No. can or cannot be entered. By default it is generated with date time. Select **Machine No.** from the drop down list which displays all machines from the *Machine* master. Select **Part Code** from the drop down list which displays all Parts defined in the *Standard QAP* screen. You cannot proceed if no parts have been defined. Select **Process Code** which displays all processes defined in the *Standard QAP* screen for the selected Part Code. You cannot proceed if no processes have been defined.
All Parameters defined for the selected Part Code and Process Code in the *Standard QAP* screen are displayed. You cannot proceed if no parameters have been defined. Click on the **Instrument Code** field to display instruments from the Instrument master. Every parameter has an *instrument type* defined for it. Only instruments of this *type* are displayed. Select Instrument Code.
Click **Save** to save the record after all details have been entered. **Job. No.** and **Work Order No.** are generated. The QAP for the Work Order is inherited from the *Standard QAP*. In **Add** mode, you cannot navigate to the other tabs. The other tabs are *Detail, Sampling, Data Access, Limits* and *Charts*.

5.1.2 Modification Of QAP Details For A Parameter

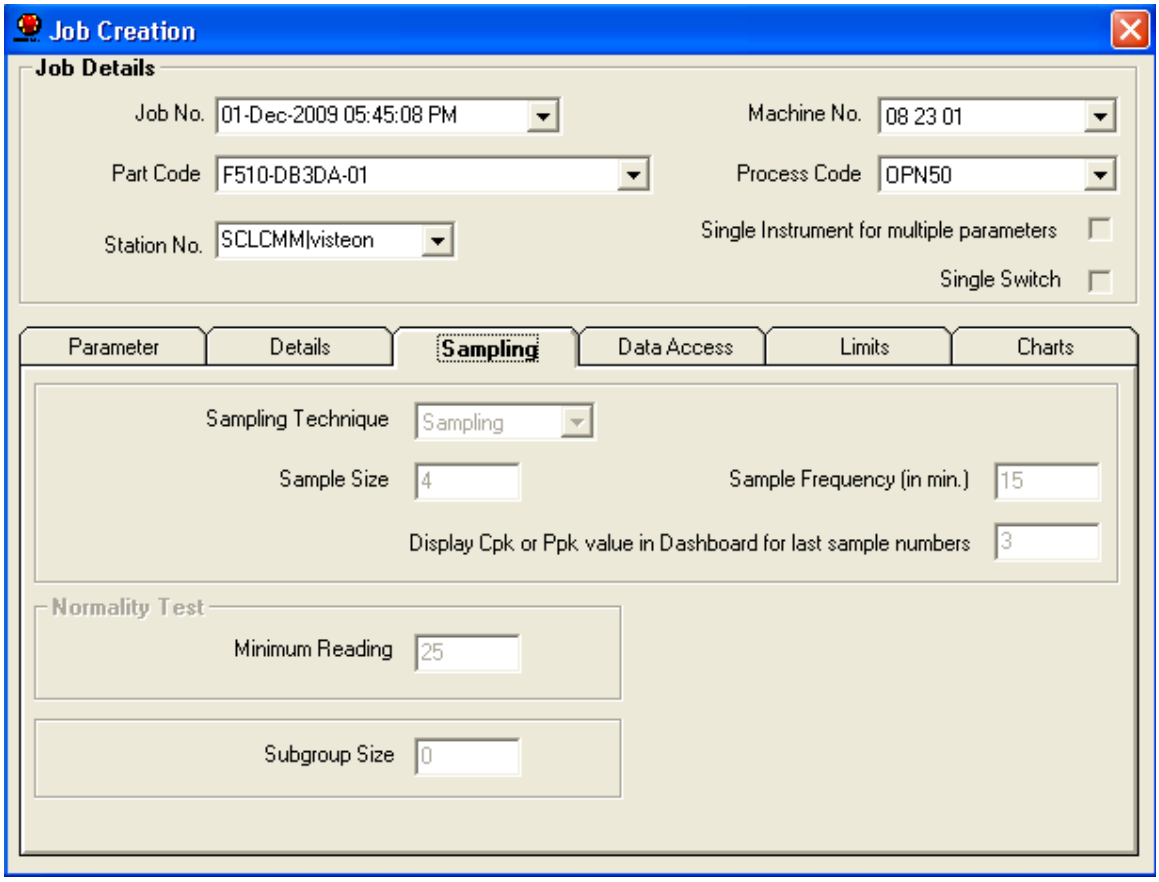
To modify details for a parameter, click **Modify.** Select **Job No.** from the drop down list which displays all existing jobs. Select **Machine No.** from the drop down list which displays all machines which have jobs defined for them. All related fields are displayed. Select **Parameter Code** from those displayed in the parameter grid on the *Parameter* tab.

You can modify details for the parameter only if no readings have been taken for it. Changes made are reflected in the *Work Order QAP*. Select the required tab.
The *Detail* tab is displayed below.



On the ***Detail*** tab, you can modify all fields other than Parameter **Code** and **Description**. Select. **UOM Code** from the drop down list displayed from the *Unit Of Measurement* Master. Select **Decimals** from the drop down list, which contains numbers 0 to 5.
Select **Parameter Type** from the drop down list – whether *Variable* or *Attributive*. Unit of Measurement cannot be entered for attributive parameters. The *Data Access* and *Limits* tabs are disabled for attributive parameters.
Select **Parameter Category** from the drop down list – whether *Critical* or *Optional***.** If a parameter is specified as critical, at the time of *Job Closure*, an error message is displayed if no readings have been taken for that parameter.

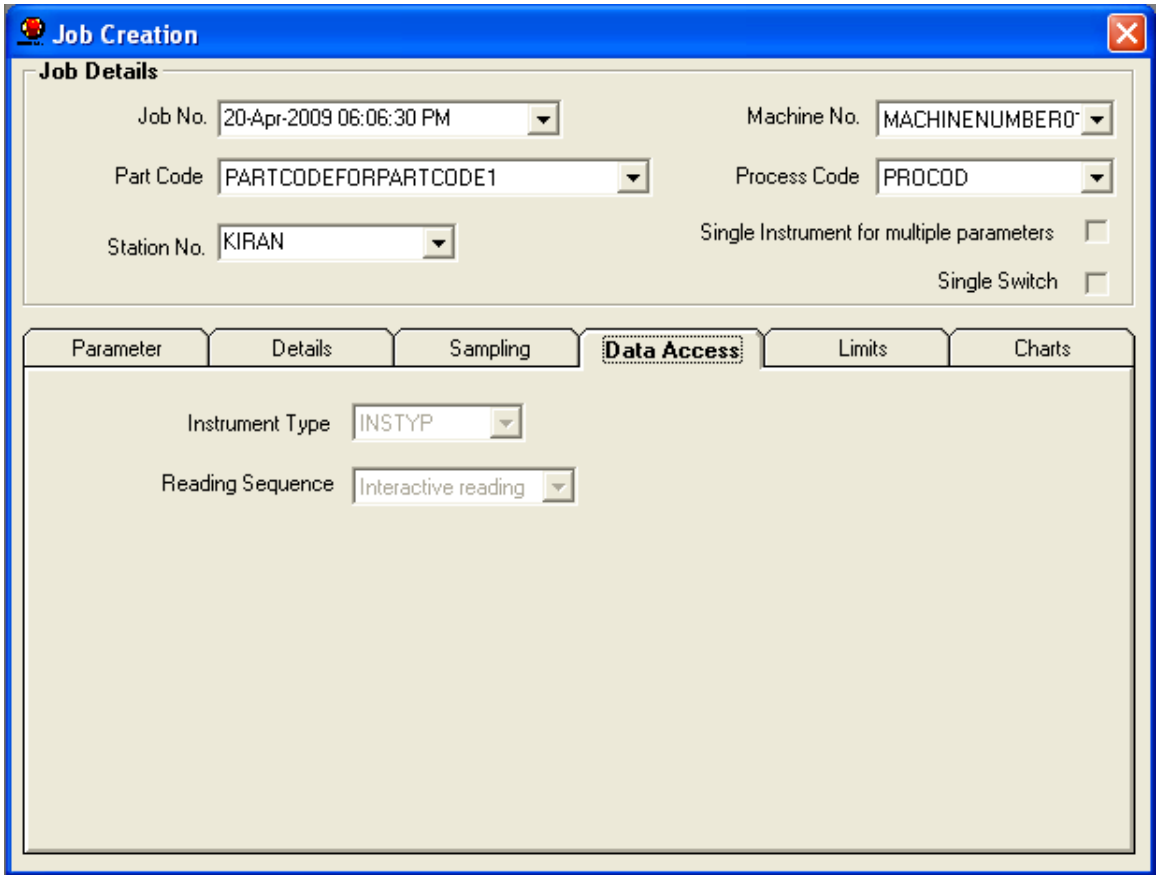
The *Sampling* tab is displayed below.



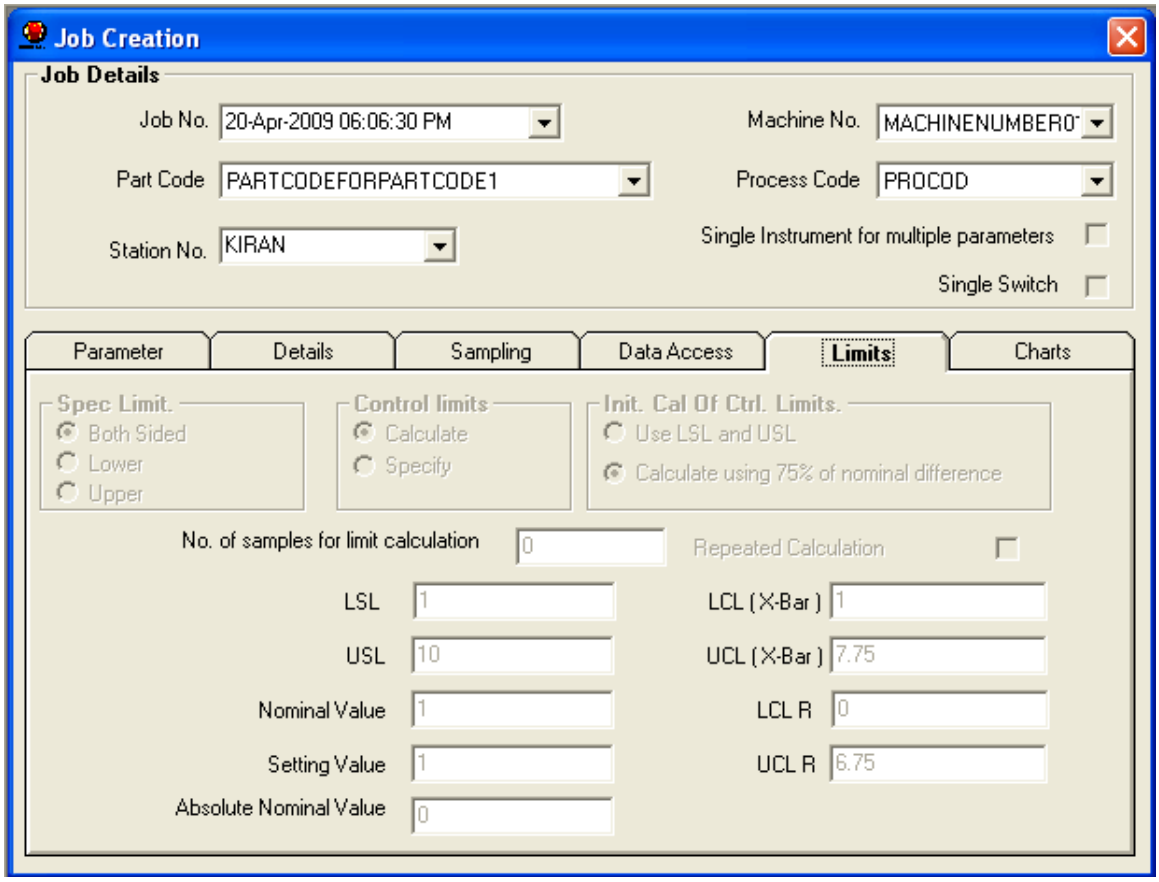
Select **Sampling Technique** from the drop down list – whether *Sampling* or *100% Inspection*.
For *Variable* parameters:
If sampling option is selected, you must enter **Sample Size** and **Sample Frequency**.
If 100% inspection option is selected, you must enter **Sample Size** only. Sample Size can be 2, 3 or 4 only. Only if *Pre- Control Chart* option has been selected under the *Charts* tab then Sample Size is 1. You can enter Sample Size greater than 24 only if it is fully divisible by 5.

Field 'Display Cpk or Ppk value.' added to know the system to calculate Cpk or Ppk based on the last sample numbers, if user enters 0 (zero) then system will calculate the Cpk or Ppk based on all sample. If user put the sample no 20 then system will calculate for last 20 samples.

For *Attributive* parameters you must enter **Subgroup Size** only. If subgroup size is not fixed, you can enter 0 in this field.
The *Data Access* tab is displayed below.



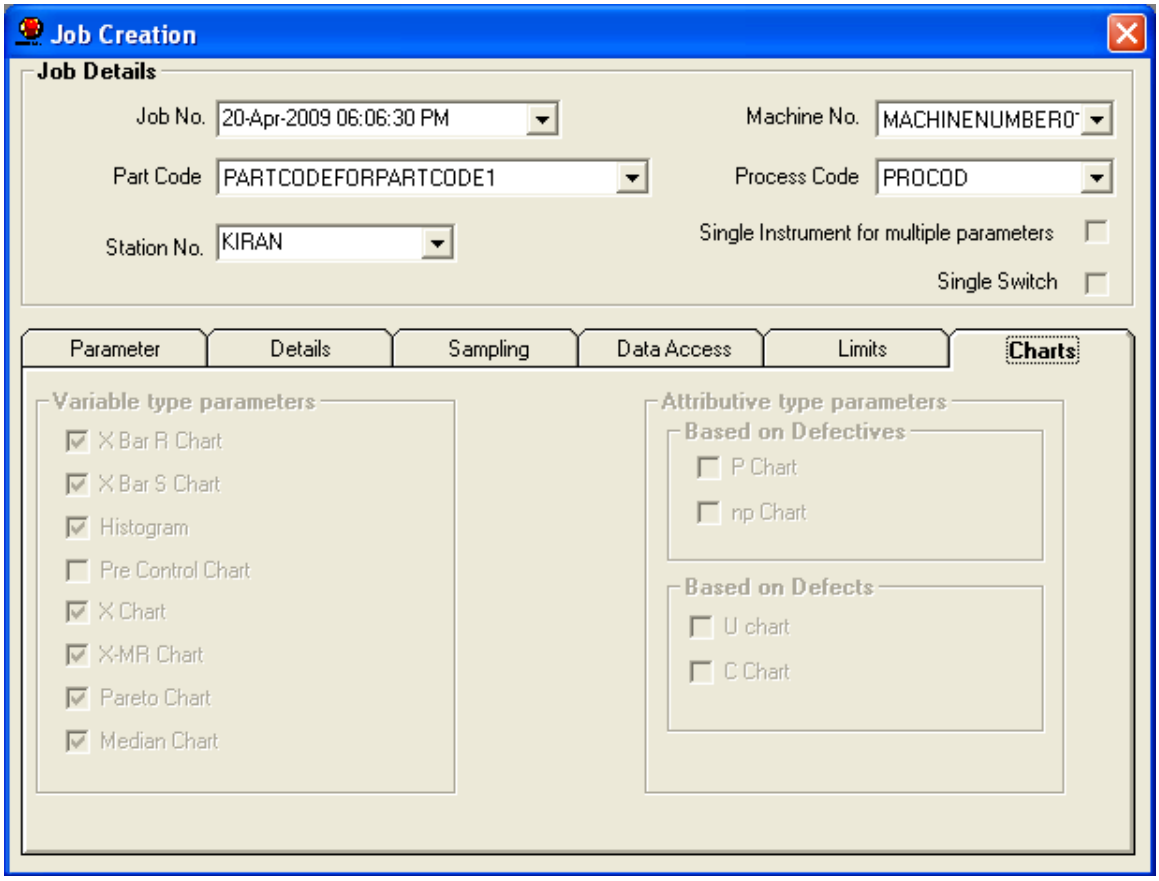
Select **Instrument Type** from the drop down list, which displays all types from the *Instrument Type* master. Select **Reading Sequence** from the drop down list – whether *Continuous Reading* or *Interactive Reading.*
The *Limits* tab is displayed below.



Select the required option from the **Specification limits** group box.
Both Sided – Parameter considers both LSL and USL. Both must be entered and USL should be always greater than or equal to LSL
Lower – This option is disabled.
Upper – Parameter considers only USL. LSL cannot be entered. It is set to 0.

Select the required option from the **Control limits** group box.
Calculate – The control limits are calculated by the system.
Specify – You want to specify the control limits.
If you select the **Calculate** option, then you must also select the appropriate option from **Initial Calculation Of Control Limits** group box.
Use LSL and USL – The Specification Limits are considered as the initial control limits.
Calculate using 75% of nominal difference – The control limits are calculated on the basis of 75% of the Nominal Difference. Please also refer to the *Formula used for calculation of control limits*.
UCLx, LCLx, LCLr and UCLr are calculated automatically depending upon the specified calculation methods.
You may enter the **No. of samples for limit calculation**. If number of samples for limit calculation entered is greater than 0 and you want the control limits to be calculated repeatedly then you must check in the **Repeated Calculation** edit box. You may enter the **Nominal Value** and the **Setting Value**. Nominal value should be between LSL and USL. In case *Lower* option has been selected, Nominal value should be greater than or

equal to LSL. In case *Upper* option has been selected, Nominal value should be less than or equal to USL.
The *Charts* tab is displayed below.



On this tab, you may specify the type of control charts you would like to view. You can select the charts based on type of parameter – whether *variable* or *attributive*. If no charts are selected and you click **save,** an error message is displayed. At least one chart must be selected.
Charts available for **Variable Type Parameters** are:
X Bar R chart
X Bar S chart
Histogram
Pre-control chart (disabled)
X chart
X MR chart
Pareto Chart
Median Chart
If 100% Inspection option has been selected on the ***Sampling*** tab, then **X Bar R Chart** and **X Bar S Chart** cannot be selected.
Charts available for **Attributive Type Parameters** are:
P chart
nP chart

U chart
C chart
Depending on the **Subgroup Size** you have set on the **Sampling** tab, attributive charts can be selected. If **Subgroup Size** is greater than 0 then all charts are available. If **Subgroup Size** is 0 then only **P Chart** and **U Chart** are available. **P** and **nP** charts fall under '**Based on Defectives**' group. **U** and **C** charts fall under '**Based on Defects**' group. Charts can be selected under one group only.

Single Instrument for multiple parameter -
In Job creation screen a checkbox is displayed for **Single Instrument for multiple parameter**. If user clicks this check box then the functionality one instrument for different/multiple parameters is made available to the user i.e. when the user selects the instrument code for a parameter, then it should be the same for the remaining parameters also for that instrument Type. If there is a job, which has 5 parameters, out of which 4 parameters have the same instrument type and 1 parameter has a different instrument type, so when the user has selected the instrument for the first parameter then it should display same instrument for the remaining 3 parameters and the user should be allowed to select the instrument for the 5th parameter manually. If user does not select the check box of Single instrument for multiple parameters then user should select the instrument for individual parameter in job creation.

Formula field in the StdQAp should use the parameters if required, which are defined under the selected Part and the Process. User should not define – in the parameter code when that parameter is used in the Formula field.

Single Switch - If Job is of single switch, i.e. there will be different instrument attached to different parameter, and different port for each parameter. All the parameters data will be dumped on the press of a single switch and if any one parameters data is not coming from the respective port then all the parameters data will be ignored and it would not update the database.

5.1.3 Deletion Of Job, Work Order Or Parameter

Click **Delete** to delete the currently selected record. If some readings have been taken for the parameter, it cannot be deleted. If the parameter which is deleted is the only one existing for a particular job, then the related *Job* and *Work Order* also gets deleted.

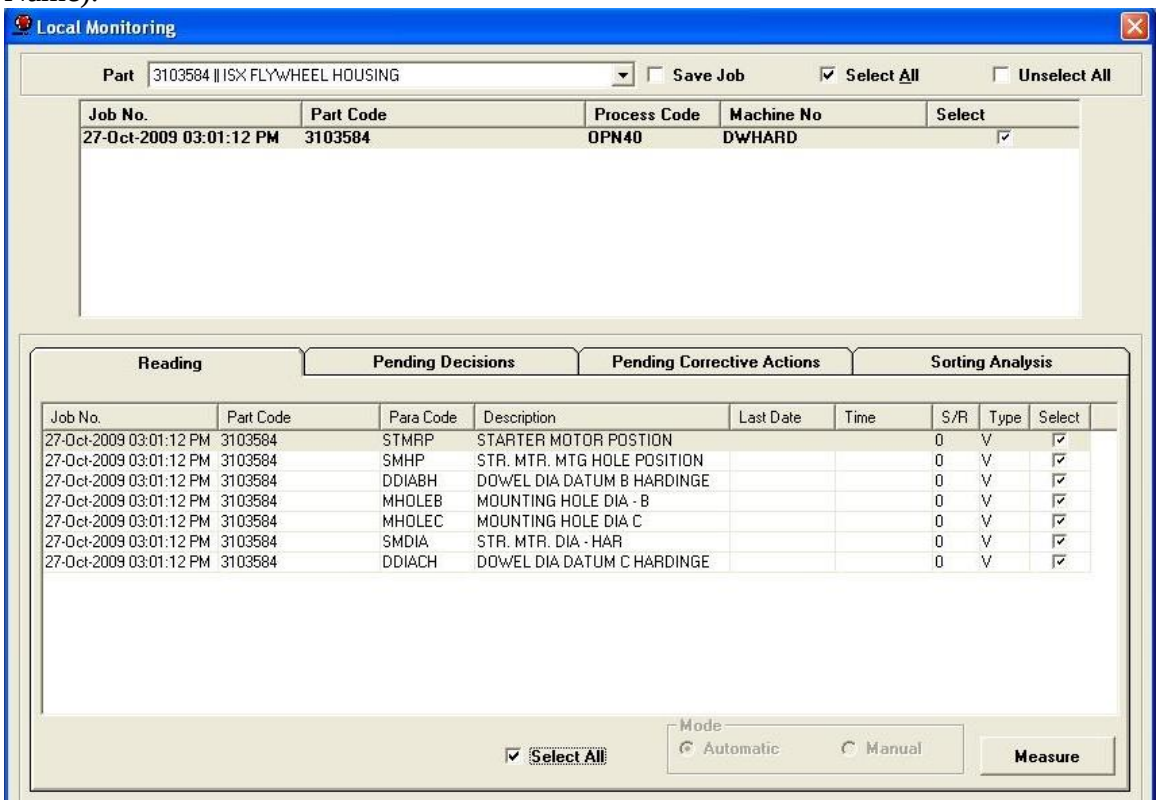
5.2 Local Monitoring

Select **Monitoring|Local Monitoring** from the Main Menu to display the *Local Monitoring* screen. Use this screen to access information about all jobs created on the local machine and all parameters of selected jobs with details such as reading date, time and count. This screen also provides details of Pending Decisions, Pending Corrective Actions and Sorting Analysis.

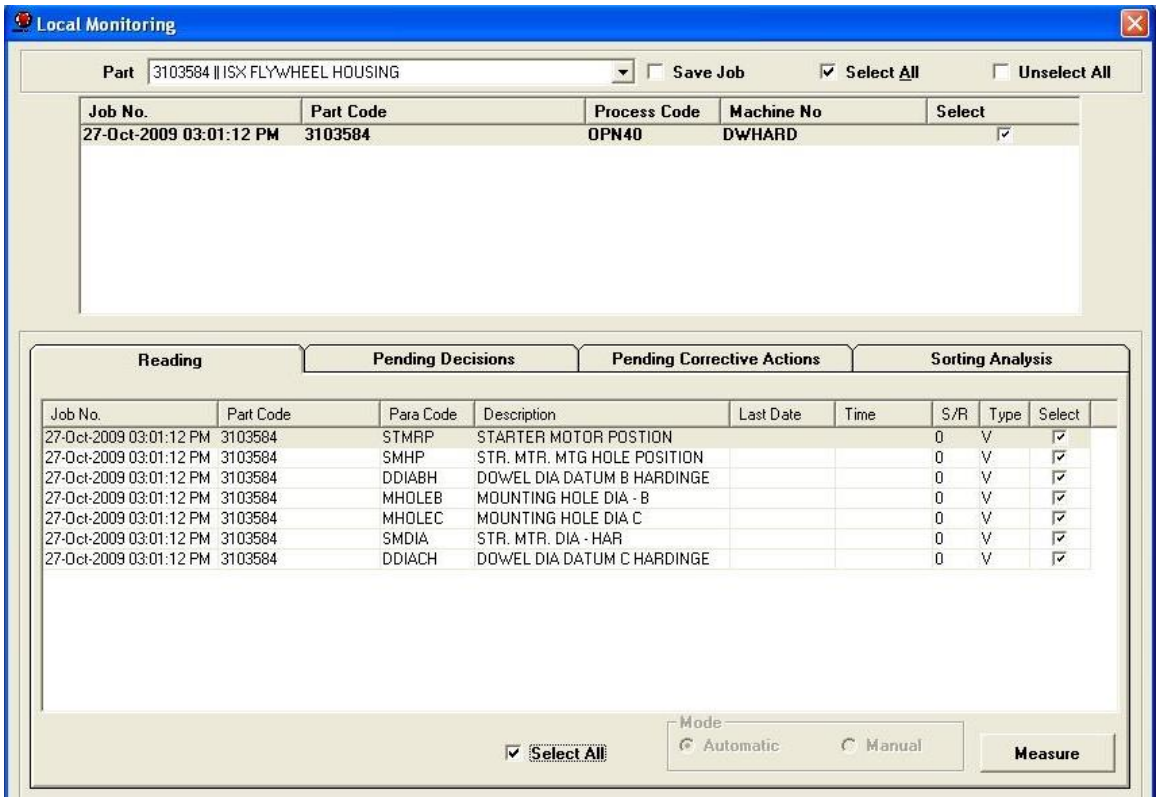
Part combo is provided above the job grid for the filter of specific jobs of selected Part No.When the form is launched, by default First part will get selected from the part combo box so that job grid will get filled based on the selection of part. When user select blank from the part combo then all job i.e. different part will get listed in the Job grid.

When windows user flag from Configuration file is true then system should display jobs with station no (Computer Name) + Windows user.

When windows user flag from Configuration file is false then system should display jobs with only station no (Computer Name).



5.2.1 The Reading Tab



When this screen is launched, all jobs for the local machine are displayed in descending order of **Job No.** on the *Reading* tab. If the job has been created using *Work Order Maintenance* and *Job Details* screens then the caption of the first column of Job grid will be **Work Order No.** instead of **Job No.**
'V' indicates *Variable* type parameters. **'A'** indicates *Attributive* type parameters. By default, the checkbox for the first job is selected. You may select more jobs if you wish to take readings for multiple variable parameters. As you select jobs, parameters for those jobs get displayed below for selection.

Grid under Reading tab (i.e. Parameter grid) will display the details such as Job No., *Part Code,*Parameter Code, its Description, Last Sample Date and Last Sample Time, No. of Readings and Type for all parameters defined for all selected Job. If parameter type is Variable then type will be V. If parameter type is Attributive then type will be A. All checkboxes for all parameters in the Parameter grid will be unchecked by default. User will be allowed to select more than one variable type of parameters by checking the checkboxes for required parameters before clicking on Measurement button. This multi select property is not applicable for attributive type of parameters.

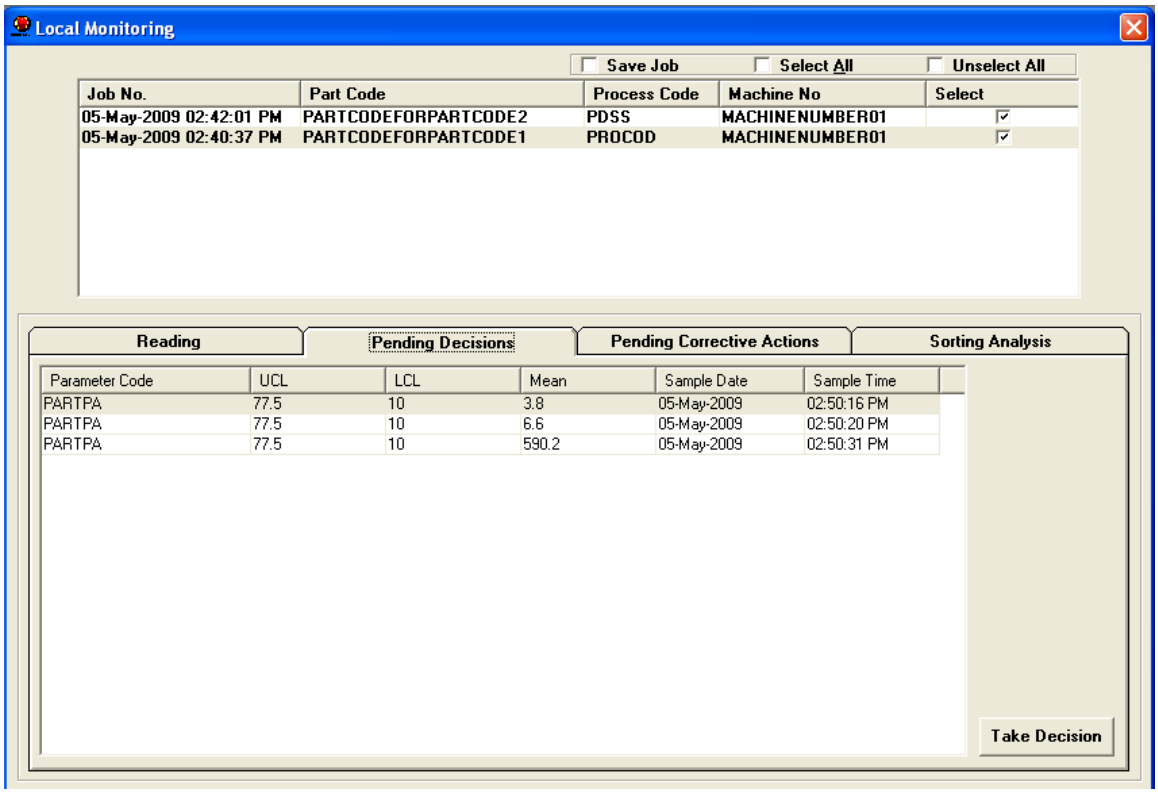
If an instrument gives multiple parameters, selection of one of these parameters automatically results in selection of all parameters. De-selection is done in the same way.

Please note, that you can select only one attributive parameter.

If the parameter selected has *Pre-control Chart* set from *WoQap/JobCreation* then user can select more than one parameter i.e. non-pre control variable parameter and pre-control parameter.

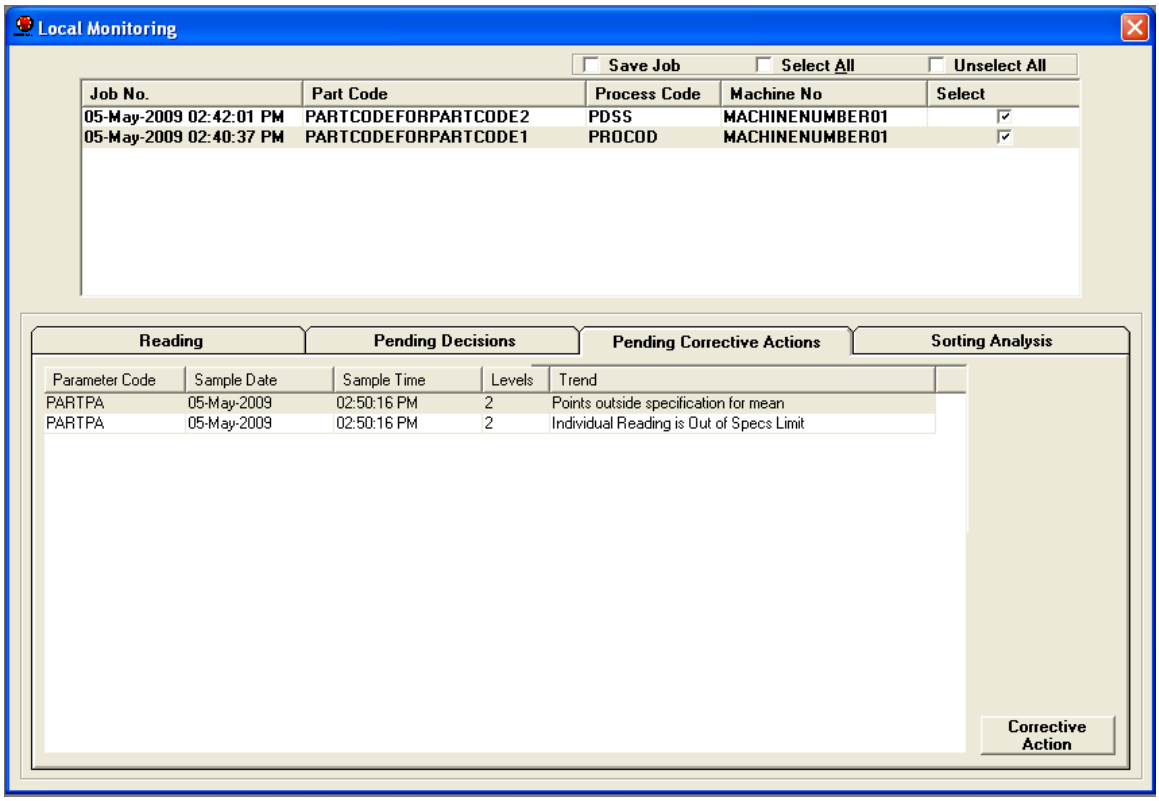
You may also deselect jobs. At least one job must be selected to view reports and charts.
To change the mode of taking readings – whether *Automatic* or *Manual*, click **Modify.**
For *Attributive* parameters the reading mode must always be Manual. Click **Save** after changes have been made.
If you change the mode for any variable type of parameter and save it then the same mode will be saved for all other variable type of parameters displayed in the parameter grid.
Click **Measure** to launch the Measurement screens.
For Variable parameters, the *Data Analysis and Data Capturing Screen* is launched. If 100 % Inspection option has been selected for the parameter at the time of job creation, then **Last Sample Date** and **Last Sample Time** are updated after each reading.
If Sampling option has been selected, **No. Of Readings, Last Sample Date and Last Sample Time** are updated after each sample.
For Attributive parameters, the *Measure For Attributive Type* screen is launched. **No. of Readings, Last Sample Date** and **Last Sample Time** are updated after each reading.
When you take readings using the Data Analysis and Data Capturing Screen if some readings for a particular sample are not within control limits or specification limits, you are asked whether you wish to take a decision about what should be done with the sample. On confirmation, the Decision screen is displayed.
Where the average of the readings is also not within limits, you may enter decisions and corrective actions. Records for which you do not take a decision are displayed on the Pending Decisions tab. Records for which you do not take corrective action are displayed on the Pending Corrective Action tab.
Where the average of the readings is within limits, you may enter corrective actions only. Records for which you do not take corrective action are displayed on the Pending Corrective Action tab.

5.2.2 The Pending Decisions Tab



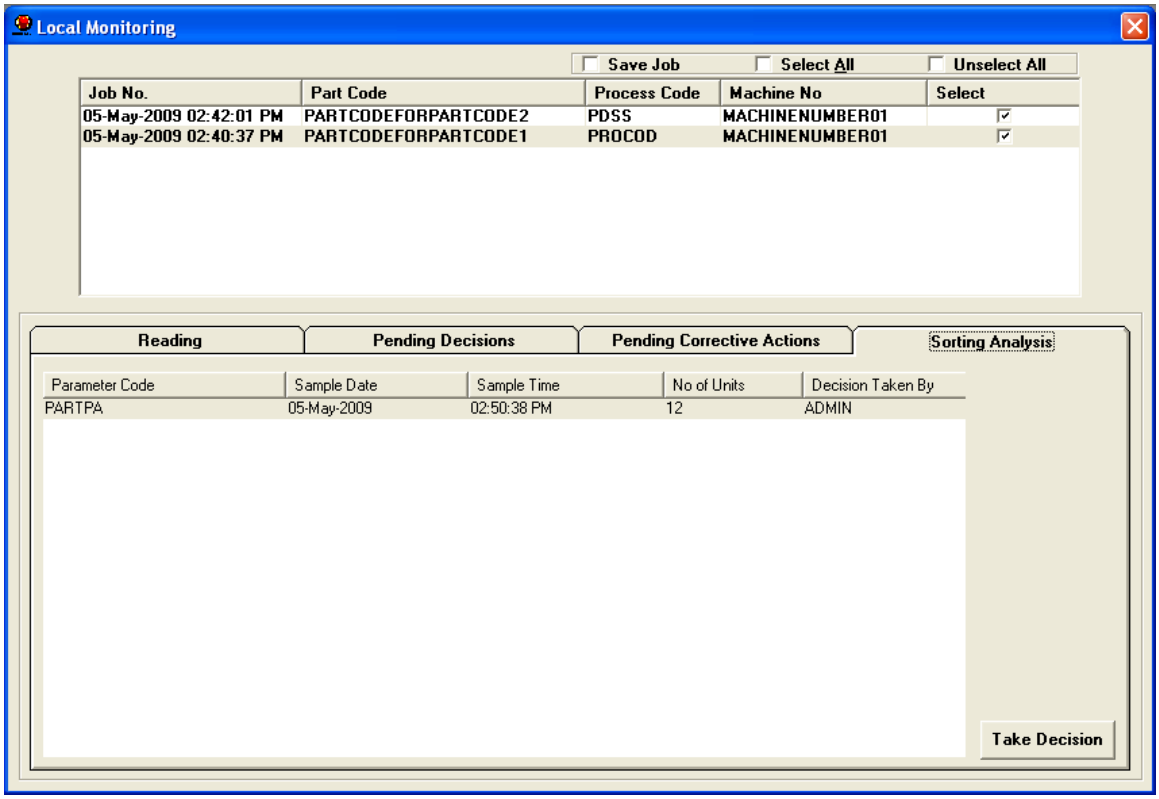
Select a single parameter and click on the *Pending Decisions* tab to view all the pending decisions for the selected job and parameter. **Parameter Code, UCL, LCL, Mean, Sample Date** and **Sample Time** are displayed. Click **Take Decision** to display the *Decision* screen. After a decision is taken, the record is not displayed on this screen.

5.2.3 The Pending Corrective Action Tab



Select a single parameter and click on the *Pending Corrective Action* tab to view all the pending corrective actions for the selected job and parameter. **Parameter Code, Sample Date, Sample Time, Levels** and **Trend** are displayed. Click **Corrective Action** to display the *Corrective Action* screen. After corrective action is taken, the record is not displayed on this screen.

5.2.4 The Sorting Analysis Tab



Select a single parameter and click on the *Sorting Analysis* tab to view the records for which you select the **Sorting** option in the *Decision* screen. **Parameter Code, Sample Date, Sample Time, No. Of Units** and **Decision Taken By** are displayed. Click **Take Decision** to re-display the *Decision* screen. After a decision is taken, the record is not displayed on this screen.

5.2.5 Job Closure

Select the job to be closed. You may select **Monitoring|Job Closure** from the Main Menu or click **Job Close** on the toolbar to close the job. System will ask 'Are you sure you want to close this job'. If user presses 'Yes' system will ask 'Do you want to create a job internally?' If user presses 'Yes' then system will create new job internally. Job Number will be Current date time and other details will be taken from the latest QAP for the selected Part and process of the closed jobs.

If the *Work Order Job Combine* is being used, on deletion of the last job of a work order, the Work Order gets deleted also.
You cannot close the selected job if:
Critical parameters exist for the selected job and no readings have been taken for them.
Some decisions are pending for the job.

While closing the job from Local Monitor / Global Monitor and creating the Job internally then s/w will ask user 'Do you want to retain the old data in the Latest Job' If user say Yes then software will copy the last reading and sample in the latest Jobs for continuity purpose and control Limit also.

5.2.6 Auto Job Selection Facility

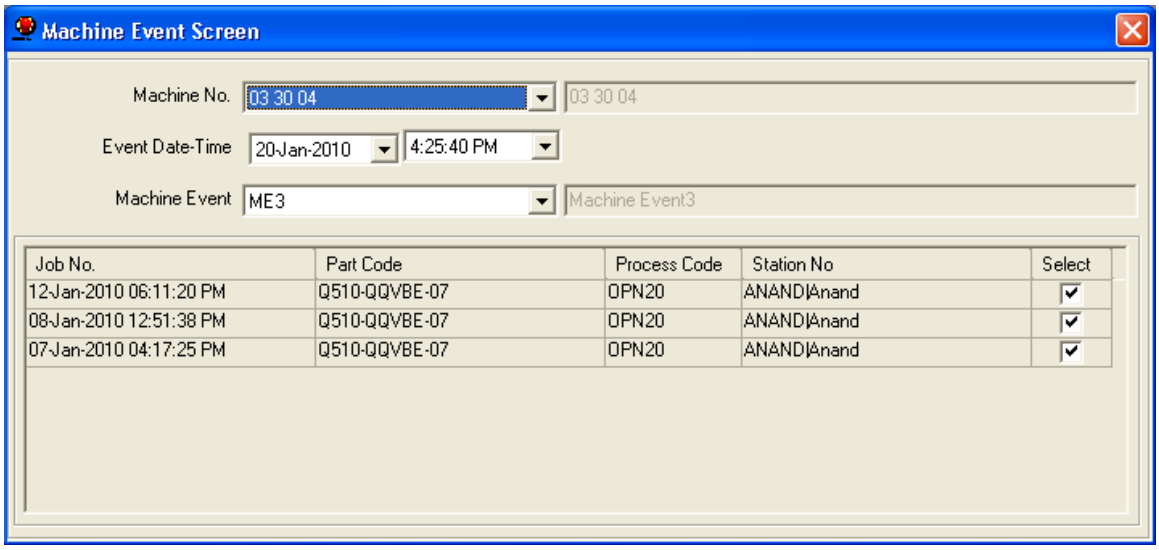
When the form is launched, it should display all the jobs for the local machine. Jobs will display in the descending order of Job No. so that the latest job will appear first in the list. The user checks the select all check box, all the jobs in the job grid will be checked and the corresponding parameters will be displayed in the parameter grid. If all the jobs are selected in the job grid and select all button is clicked the selected jobs are unchecked and the corresponding jobs parameter are removed from the parameter grid.

If the select all checkbox is checked and all the jobs in the job grid are selected and the user clicks on unselect all check box the jobs get unselected and unselect all is disabled and select all is unchecked and enabled.

If the select all checkbox is checked and all the jobs in the job grid are selected and the user clicks Save Job, then next time when the Local Monitoring screen is launched the user will get all the previously selected jobs automatically

5.3 Machine Event

Select Monitoring/Machine Event from Main Menu to display the Machine Event master. Use this option to create machine event for selected machine, event date, event time & jobs for selected machine.



- On **Add** operation, all Machine No, Machine Event will get populated in respective combo box. All Job for machine will filled in a grid.
- On **Modify** operation, if record for selected machine no is not available in event remark then user can modify the record for event date, event time, and event code.
- On **Save** operation, record for selected machine no will get saved. Selection of job no will be the optional for machine event.
- On **Delete** operation, if record is not available in event remark then selected record will get deleted.

For selected machine no have more than one record in machine event then combo box for event date/time/event code will get filled with respective record so user can navigate the record for same machine no.

5.4 Measurement

5.4.1 Measurement Of Variable Parameters

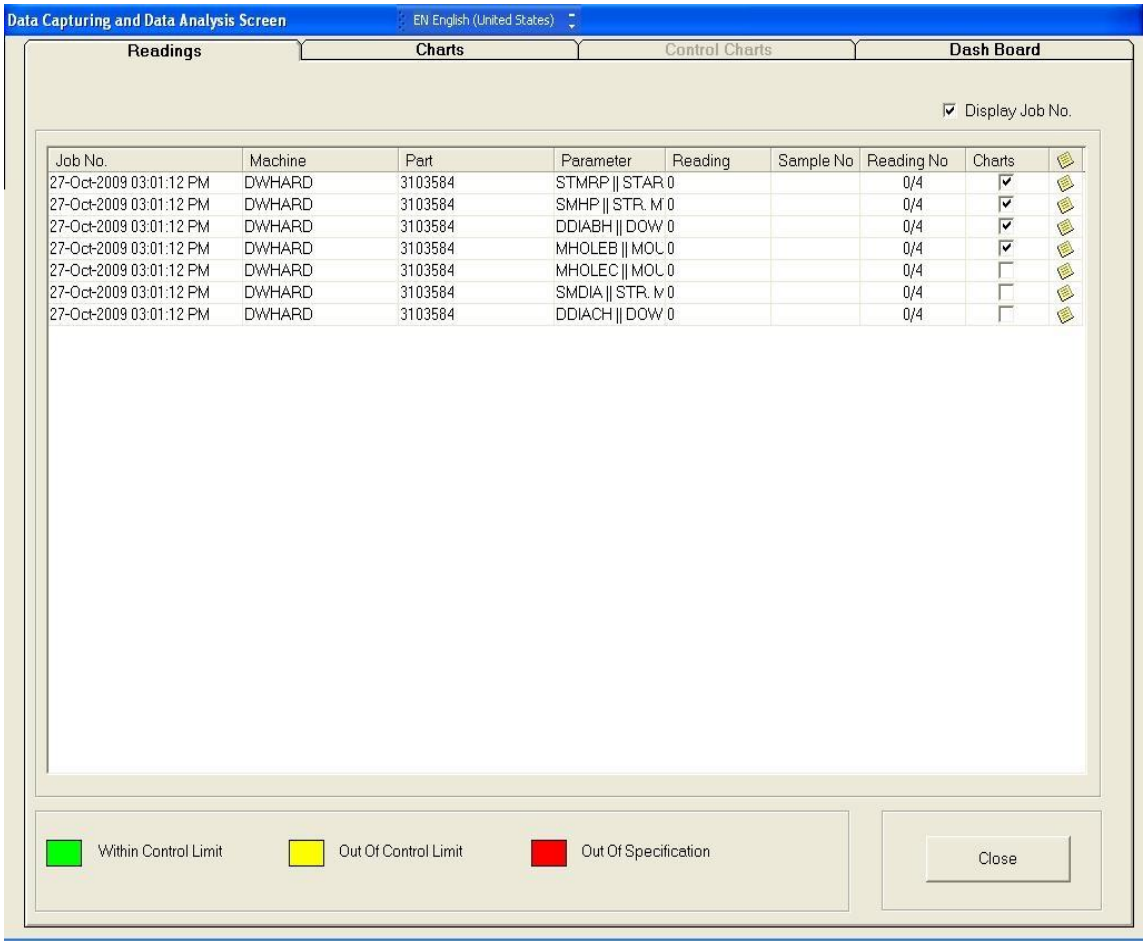
The *Data Capturing and Data Analysis* screen is launched when you click **Measure** on the *Reading* tab of the *Local Monitoring* screen.
Use this screen for:

- Recording data for multiple *Variable* parameters for multiple jobs manually or automatically.
- Viewing Trends which occur during capture of data.
- Viewing Charts for Data Analysis.

This screen has five tabs – the *Readings* tab, *Charts* tab, The Control Chart, Bar Display, Cp/Cpk or Pp/Ppk tab.

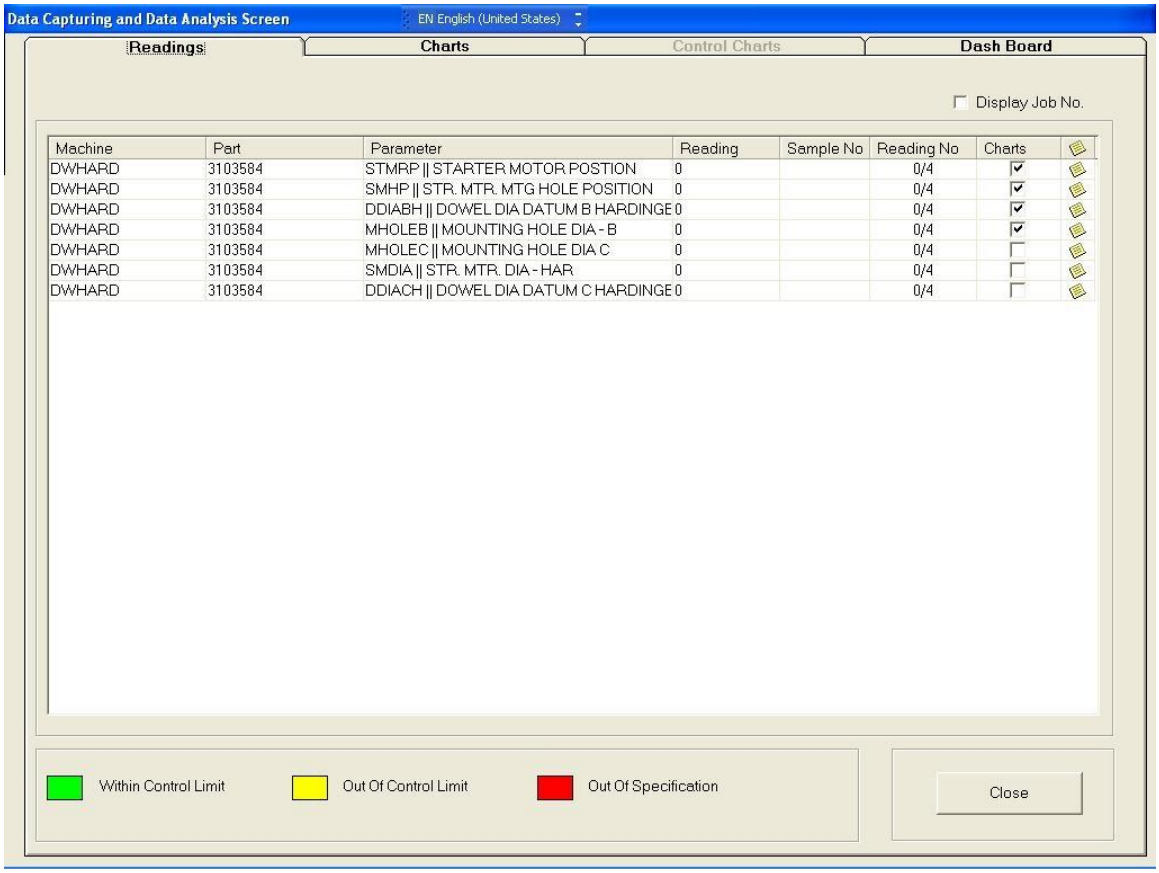
After measurement screen get launch and job is of Esya Instrument, request will send to Instrument by using the Instrument address of the parameter, for collecting the data after each 20 sec.
During dumping a data, system will check send & received command address is same or Not if it is different the log file will get updated for send & received command address.
Data will get stored only when the reading number is different than earlier.
Example – Instrument return COYR1+000.487, system will check Reading No 1 is last reading No for selected parameter, If yes then system will not dump the data/reading
If no data will get stored in the respective parameter.
Close button will get disable during sending a request. After finishing the request for all parameter Close button will get enabled.

5.4.1.1 The Readings tab



This tab displays all parameters which have been selected for measurement from the *Local Monitoring* screen. Since parameters are for multiple jobs, job details are also displayed.

Display Job No. check box is provided in Reading Tab.
When user selects Display Job No. then JOb NO. can be seen in the grid else can not be seen.Size of the Part and Parameter column can be changed.



5.4.1.1.1 Recording Readings Manually

Enter readings in the **Reading** field. The background color is set based on limits specified for the parameter:

- Green - The reading is within control limits.
- Yellow - The reading is out of control limits.
- Red - The reading is out of specification limits.

The reading displayed is the setting value plus actual reading entered.
For a manned station, if the reading is entered manually, it is saved when you press **Enter.**
The current reading serial number in the current sample is displayed as the **Reading No.**
Select or deselect the **Chart** column depending on whether you wish to view charts for the readings of the parameter on the *Charts* tab. Upto four *Critical* parameters are selected by default. If no critical parameters exist, the first four parameters are selected.

5.4.1.1.2 Sample Frequency

Screen should check that readings for parameter are taken as frequently as defined in Sample Frequency in Standard QAP. If readings are not taken within time and in company setting user checked Display/Capture Time to Take Reading then screen should notify that readings are not taken and it's time to take reading. Notification will be different in manned and unmanned station. In case of manned station message will be displayed on screen. And in case of unmanned station message will be inserted in

message table for all supervisor users. Supervisor user is one whose role is defined as "SUPER ". Sample frequency is made available for 100% inspection and sampling technique. Time to take reading message will not get display or recorded if check box of Display/Capture Time to Take Reading is not checked.

5.4.1.1.3 Deletion of Reading/sample

When the user presses the key F6 for any of the parameters for which readings are entered, then it would ask user "Are you sure you want to delete this reading?" with Yes/No. If the user clicks on No the reading is not deleted. If the user clicks on Yes then one reading deleted for that parameter
While deleting the sample it will check corrective action has been taken or not, if corrective action has been taken then it will display. "Corrective action has been taken. Do you want to delete the sample? " If the user clicks on No the sample is not deleted, if the user clicks on Yes the sample is deleted.

While deleting the sample it will check for Trend raised. If trend raised then it will display. "Trends have been raised. Do you want to delete the sample? " If the user clicks on No the sample is not deleted, if the user clicks on Yes the sample is deleted and trend will get reset.

When sample is completed & user Press F6 then system will prompt the message "Are you sure you want to delete this sample" & if user press Yes then

- It will check corrective action has been taken or not, if corrective action has been taken then it will display. "Corrective action has been taken. Do you want to delete the sample? " If the user clicks on No the reading is not deleted, if the user clicks on yes the sample for all parameter is deleted & then grid will show 0 / Sample Size.
- If Trend raised then it will display. "Trends have been raised. Do you want to delete the sample? " If the user clicks on No the sample is not deleted, if the user clicks on yes then sample for all parameter get deleted & then grid will show 0 / Sample Size. If user press No then No sample for all parameter get deleted.

Component number is assigned and user tries to delete the sample or reading from Chart display the message ‘Cannot Delete, Component number is assigned’.

5.4.1.1.4 Deletion of the reading/Sample – For Single Instrument Multiple Parameter

When all parameter have same reading serial no and sample is not completed i.e. in case of individual reading & user Presses F6 then system will prompt the message "Are you Sure Do you want to delete reading only for the selected Parameter?"
If user Presses 'Yes' then reading for selected parameter for current Reading serial No will get deleted & Reading serial No get updated for a parameter.
If user Presses 'No' then system will prompt a message - "Are you sure Do you want to delete reading for all parameters?" If user presses 'Yes' then reading for all parameters for current Reading serial No will get deleted & Reading serial No get updated for all parameter. If user presses ‘No’ then record will not deleted.

Job is of Single instrument multiple parameter having 3 Parameters. Sample Size is 3. First two parameter has taken 2 reading i.e. 2/3. Third Parameter has taken 1 reading i.e. 1/3. User tries to delete the reading of 3rd parameter. Message should display 'Can not delete reading for the selected parameter as parameter is of Single Instrument.'

5.4.1.1.5 Remark for reading

After entering the reading, user can enter the remark for reading. Icon for Remarks – Click on this column i.e. on icon it will display the Remarks for Reading Screen with latest Sample No. and Reading No. If No Readings are taken for the parameter and try to click on icon it will display the message as 'No readings taken for the parameters'.
If a remark is present then it will show the remarks for the selected reading else it will show the Reading Sample screen.

5.4.1.1.6 Single Switch Facility

If Job is of single switch, i.e. there will be different instrument attached to different parameter, and different port for each parameter. All the parameters data will be dumped on the press of a single switch and if any one parameters data is not coming from the respective port then all the parameters data will be ignored and it would not update the database

5.4.1.1.7 Single Instrument Multiple Parameter

If Job is of Single Instrument for Multiple Parameters, then user can enter the readings more than one parameter using a single instrument. User has to take the reading sequentially.

5.4.1.1.8 LG Network Monitoring

In case of LGNetwork Monitor When user launch measurement screen from Local Monitor with job i.e. already selected in another instance of ProQMS then system should prompt the message 'Selected job is already running in another instance of same PC'

In case of LGNetwork monitor when data receives in the Measurement screen and same parameter is launched in the global Monitor screen then Measurement screen should sends the signal to Global monitor screen for refreshing the reading and chart.

In case of LGNetwork monitor when user deletes the reading/sample or Add remarks or taken corrective action in the Measurement screen of Local Monitor and same parameter is launched in the global Monitor screen then Measurement screen should sends the signal to Global monitor screen for refreshing the reading and chart.

When user tries to delete the reading or sample from global monitor screen i.e. Global view of particular parameter and the same parameter is selected in the Measurement screen of Local Monitor then system should display the message 'Cannot delete. Data collection is in progress'.

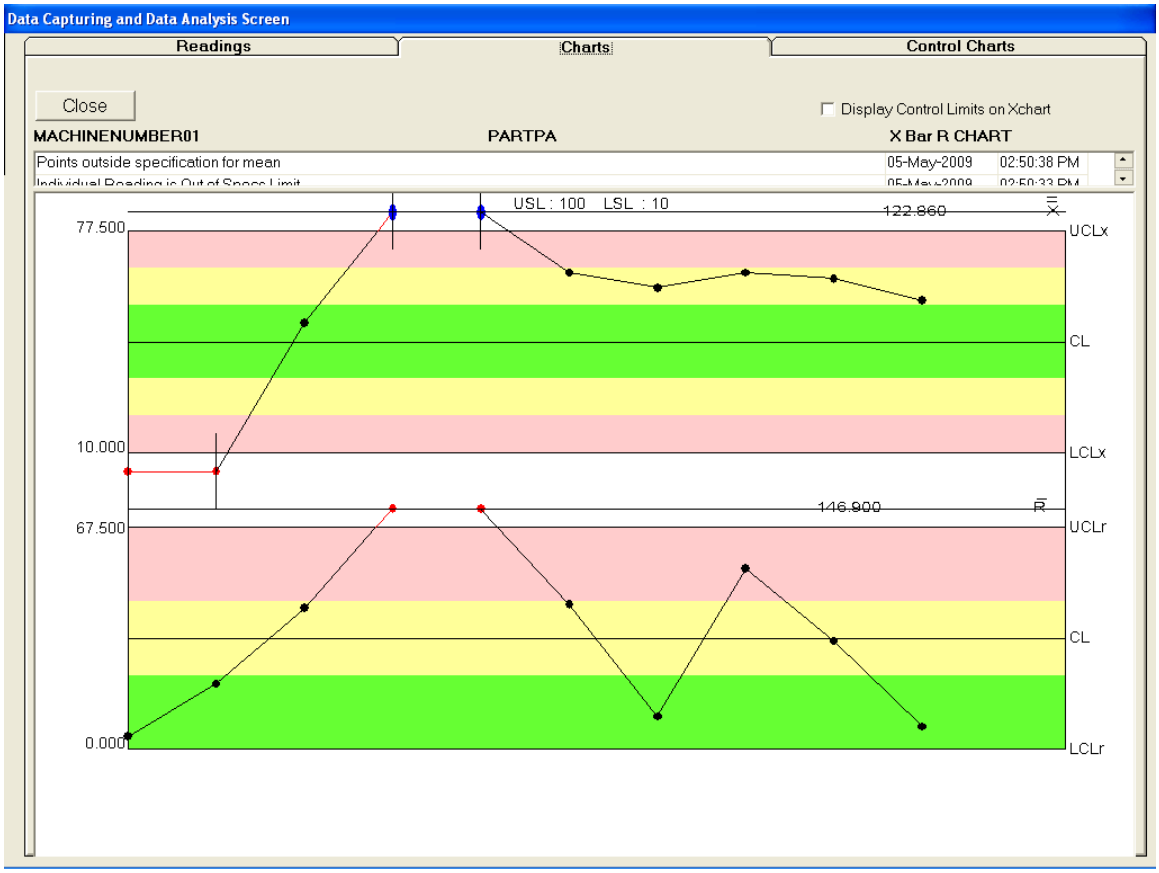
5.4.1.2 The Charts tab

To view this tab, you must select at least one parameter by checking in the **Chart** field on the *Readings* tab. The number of charts displayed will be as per the number of parameters selected.
Online XbarR charts of the selected parameters are displayed. Details like Machine no, parameter code ***and title of the chart*** are shown. Readings are plotted along with date and time of readings. You can scroll through the charts.
The number of points displayed in the online chart depends on the value entered for **display of online points** in the *Company Settings* screen. For example, if the value entered is 20, the chart plots only the last 20 samples. If no value is entered, all samples are plotted.
The last customized trend message along with date and time for that parameter is displayed in a scrollable log window. You can scroll through the history of trends raised for that parameter.
For all Line Charts: To view details of all actual readings for the samples, use the mouse to move the cursor to the points plotted on the chart. See ***Charts Tab showing 1 Chart*** below.
Double-Click on the chart to see the list of available charts for the parameter. Select the required chart you wish to view.

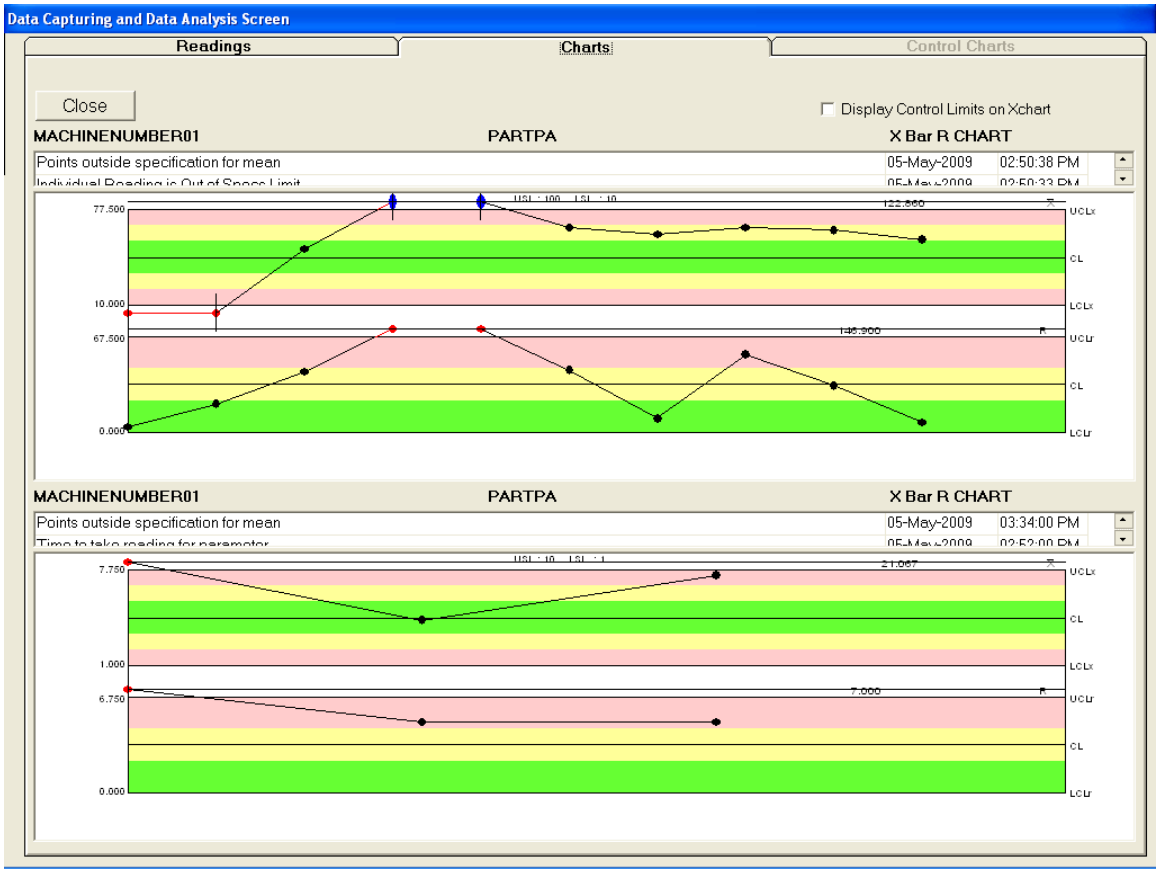
5.4.1.2.1 Trends

Trends are raised when sample size is greater than one and the average of the readings within the sample is out of limits. The last *Customized Trend Message* along with the date and time is displayed in a log window. You can scroll through this window to view the history of trends raised for the parameter.

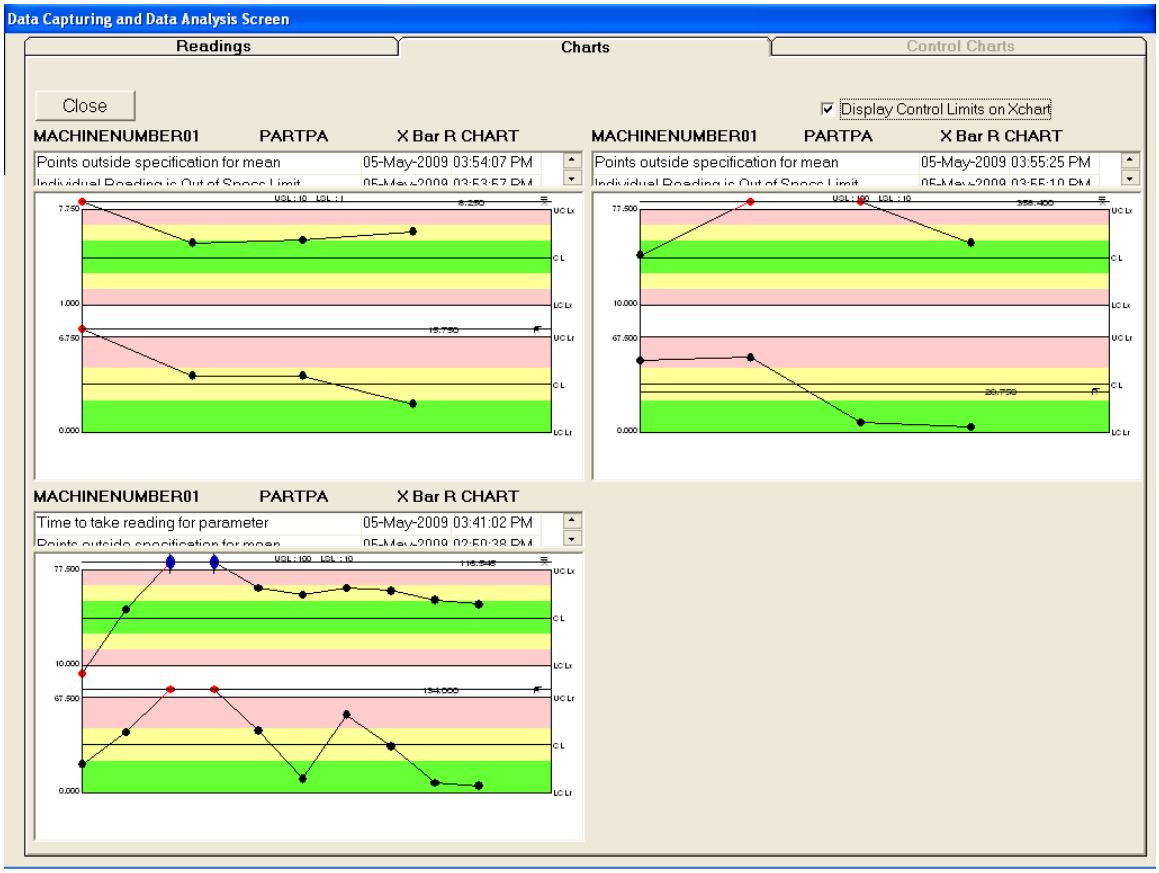
Charts tab showing 1 chart



Charts tab showing 2 charts



Charts tab showing 3 charts



Charts tab showing 4 charts

Pre Control Chart –

For parameter having pre control chart, Reading, Chart Tab will get enabled & Control Chart will get disable if all parameter having pre control chart then Cp/Cpk Tab will also get disable.

Manual Mode –

Parameter having pre control chart, display picture along with message during dumping a data.

Picture along with message will display only when after reading will get approved & there after i.e after 5 reading onwards. Picture along with message will get display , depending upon the rule set for pre control chart.

Automatic Mode –

Parameter having pre control chart, display signal on display unit during dumping a data. Signal will display only when after reading will get approved & there after i.e after 5 reading onwards. Signal (red/green) will get display, depending upon the rule set for pre control chart.

Display signal or picture for 1st 5 reading –

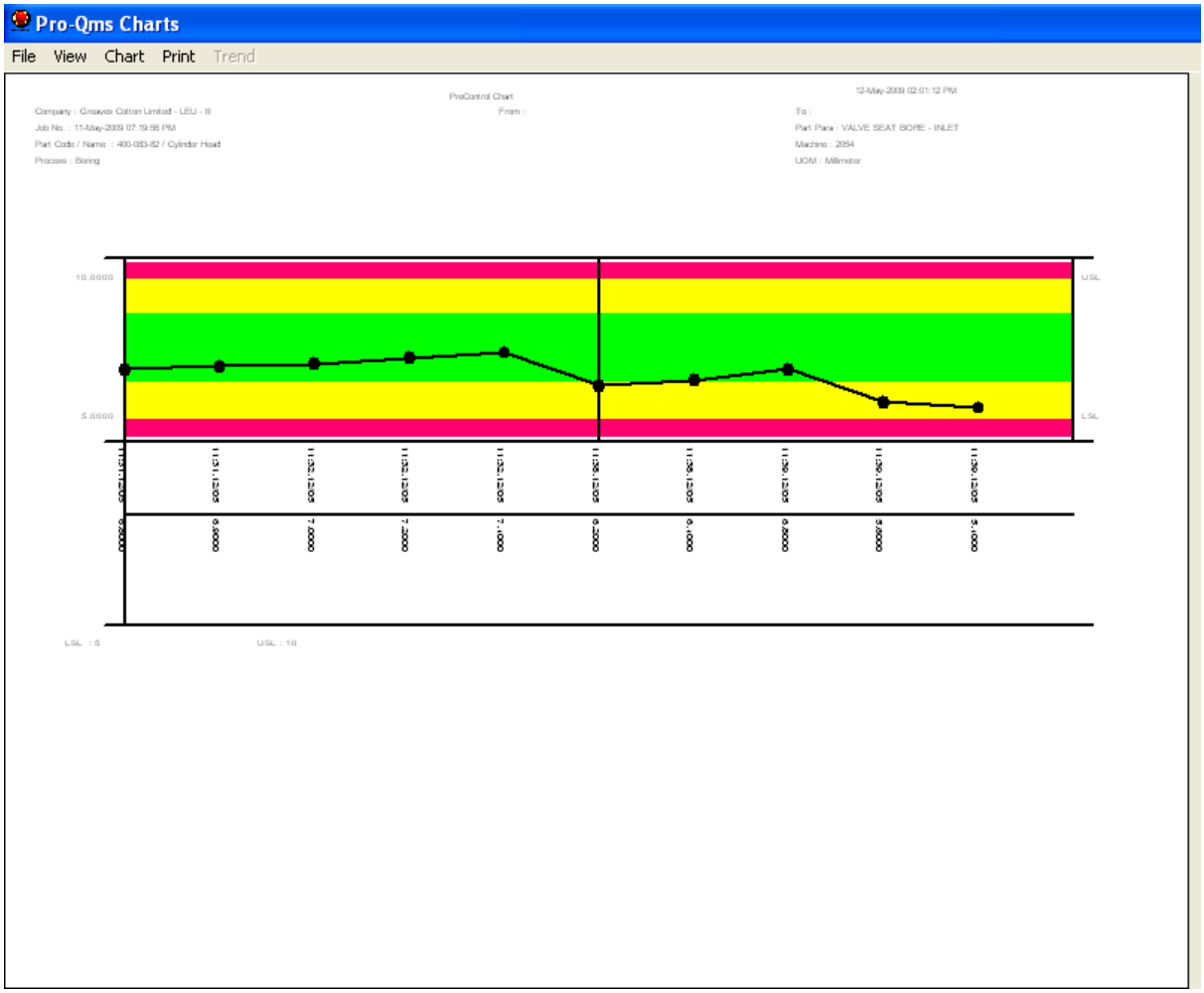
If all reading is within green zone then green picture along 'Setting Approved' message in case of manual mode & Green signal in case of automatic mode will get display.

One of the readings goes in Red zone then red picture along 'Stop' message in case of manual mode & Red signal in case of automatic mode will get display.

Only one of the readings goes in yellow zone then red picture along 'Repeat Setting' message in case of manual mode & Red signal in case of automatic mode will get display.
More than one reading goes in yellow zone then red picture along 'Adjust' message will get display in case of manual mode & Red signal will get display in case of automatic mode.

5^{th} reading onwards –
In case of manual & automatic mode, depending upon two consecutive reading signal or picture will get display.
If one of the readings is in green zone then in case of Manual mode green picture along with the 'Continue' message will get display & in case of Automatic mode green signal will get display.
If one of the readings is in red zone then in case of Manual mode red picture along with the 'Stop' message will get display & in case of Automatic mode red signal will get display.
If both the reading are in the yellow zone then in case of Manual mode red picture along with the 'Adjust the process' message will get display & in case of Automatic mode red signal will get display.

For a pre control chart parameter reading is approved. Reading Tab is active. In company setting, 'No of point to display on online chart' is 20 & user had taken 50 reading for pre control chart parameter. Pre Control chart will get refresh & redraw the chart i.e Last 20 readings i.e. 31 to 50 and additional 5 readings which nothing but approved setting reading. So the total reading on the chart is 25.



5.4.1.2.2 Sample Frequency

Screen should check that readings for parameter are taken as frequently as defined in Sample Frequency in Standard QAP. If readings are not taken within time and in company setting user checked Display/Capture Time to Take Reading then screen should notify that readings are not taken and its time to take reading. Notification will be different in manned and unmanned station. In case of manned station message will be displayed on screen. And in case of unmanned station alert will get saved. Time to take reading message will not get display or recorded if check box of Display/Capture Time to Take Reading is not checked.

5.4.1.2.3 Deletion of Reading and Sample

- While deleting the sample it will check for corrective action has been taken or not, if corrective action has been taken then it will display. "Corrective action has been taken. Do you want to delete the sample? " If the user clicks on No the sample is not deleted, if the user clicks on Yes the sample is deleted.

- While deleting the sample it will check for trends. If trend raised l display the message "Trends have been raised. Do you want to delete the sample? ". If the user clicks on No the sample is not deleted, if the user clicks on Yes the sample is deleted.

In both cases i.e. in case of sample deletion or reading deletion when the reading no is zero for the parameter and the user clicks on F6 the user should not be allowed to delete a reading or a sample.

In case of Single Instrument multiple Parameter –
User selects the sample or reading and selects Delete Reading/Sample system will prompt the message "Are you sure Do you want to Delete reading only for the selected Parameter?"
With Yes or No
If user Presses 'Yes' then record for selected parameter for selected Reading serial No. will get deleted and charts get refresh with updated Reading Serial No.
If user Presses 'No' then system will prompt the message "Are you sure Do you want to delete reading for all parameter?" with Yes or No. If user presses 'Yes' then record for all parameters for selected Reading Serial Number will get deleted and chart get refresh. If sample is completed then the user try to delete the reading then whole sample will get deleted. If sample is not completed then only specific reading will get deleted.

Job is of Single instrument multiple parameter having 3 parameters, Sample size is 3, First two parameter has taken 2 reading i.e. 2/3. Third Parameter has taken 1 reading i.e. 1/3. User tries to delete the reading of 3rd parameter. Message should display 'Can not delete reading for the selected parameter as parameter is of Single Instrument and then delete operation will get cancelled

5.4.1.2.4 Remarks

If the online chart displayed is X Chart when the user right clicks on the reading no, it displays three menu options, add remark, view remark, delete reading/sample When the user clicks on add remarks, remarks for reading screen are displayed. User is allowed to enter the remarks and click on Ok, which will launch reading sample screen. If the user clicks on cancel it will still launch reading sample screen. If a remark is present then it will show the remarks for the selected reading else it will show the Reading Sample screen. After entering the remarks one vertical line will be shown for the selected reading. When user moves mouse pointer to that particular point user can see the remarks.

5.4.1.2.5 Corrective Action

When Sample has trend and user moves the mouse pointer on that sample then it should display the Corrective action as popup similar to Add Remark, view Remarks. If the User clicks on the corrective action menu it should display a separate screen showing the trends and their level and when the user clicks on the Ok button, the corrective action screen will be launched allowing the user to take corrective action. Once the user takes corrective action that samples color becomes blue and it is large and displays the vertical line.

If the color of the sample is blue then it means corrective action has been taken and if the user selects the sample the corrective action screen is displayed with the corrective action that are taken.

5.4.1.2.6 On-Line Chart Plotting

If points are outside control limits then the sample is colored as red. If runs up trend for mean/range, runs down for mean/range, greater than mean/range, less than mean/ range trends are raised then those sample will be colored as red.

5.4.1.2.7 Angle Parameter

If parameter is of type Angle then user tries to move the mouse pointer on Sample then reading will display in both format i.e. Angle & decimal. This is done for X, X-MR, X Bar R and X Bar S Chart.

Histogram will always display in decimal whether parameter UOM is angle or Not.
Print Label as CL in histogram. Value of Centerline will be the Nominal value of that Parameter. Centerline would be red in color and the label would be CL

5.4.1.2.8 Machine Event

During dump the data, system will check any machine event happened for a machine or Not. If some machine event happened then system will attach all machine events those are assigned for job to data dumping parameter and this event will attach to same parameter for further reading. When a machine event get attach, at particular reading/sampleno vertical line of red color get draw.

When user want to see the all machine event which are attach to reading, simply move the mouse over there and press ‘SHIFT’ button.

Remark contain –

Event Date DD-MMM-YYYY hh:mm:ss AM/PM

Machine Event xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Event Date DD-MMM-YYYY hh:mm:ss AM/PM

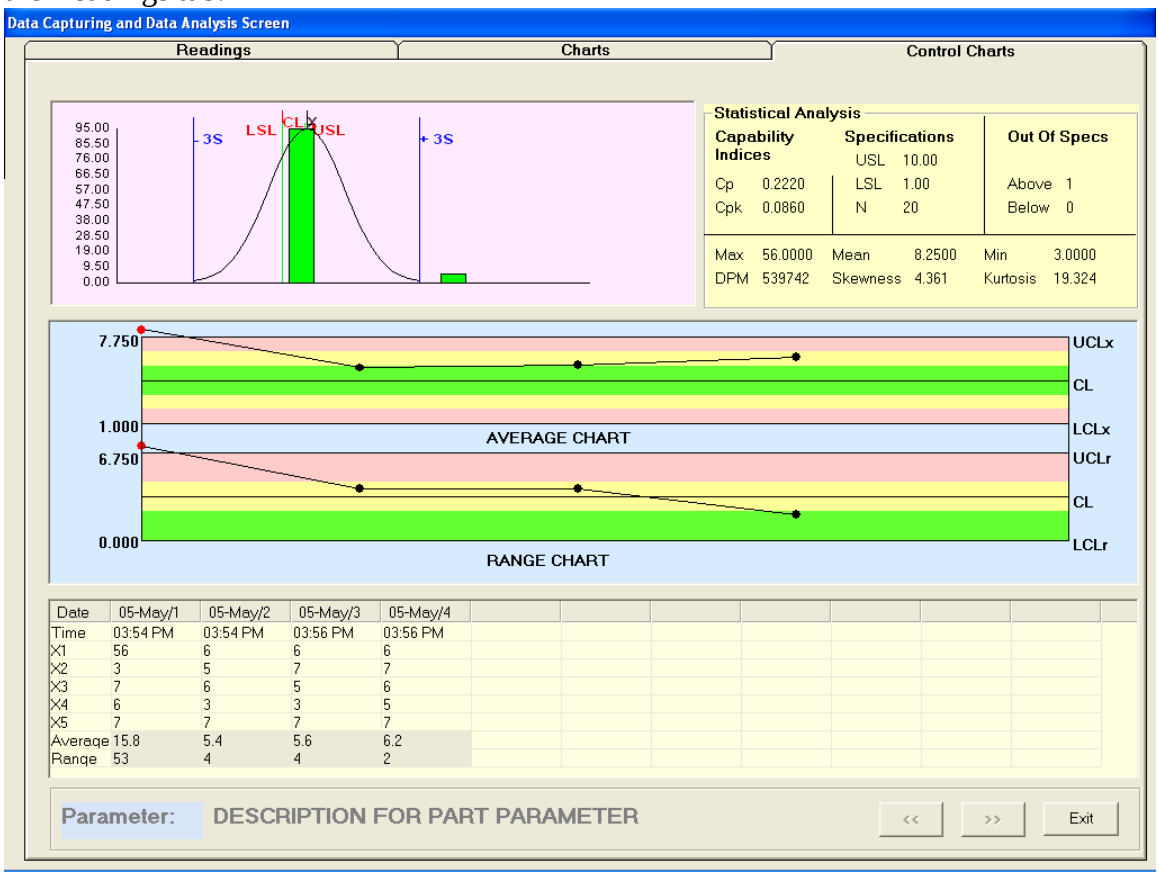
Machine Event xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

When user delete the intermediate reading for last sample no which had machine event then whatever machine event attached to reading no shift to same/next reading no.

Operator Name -
When user moves the mouse pointer on reading in chart, system displays reading, date, and Time with Operator Name.

5.4.1.3 The Control Chart tab

To view this tab, user must select only one parameter by checking in the Chart field on the Readings tab.



In this tab, user is able to view the following charts along with the readings (in samples) on one screen.

- Histogram. (For all readings.)
- XbarR Chart, X Chart and X-MR Chart (For the No. Of samples selected in the Company Settings.)
- Grid with Readings. (For the No. Of samples selected in the Company Settings.)

Following Statistical Analysis is displayed for the selected charts.

- Capability Indices – Cp and Cpk values
- Specifications – USL (Upper Specs Limit), LSL (Lower Specs Limit) and N (Number of readings)
- Out of Specifications – Above and Below (Number of reading which are above and below the specifications)
- Max – Maximum value reading
- Mean – Average value
- Min – Minimum Value reading
- DPM – Value gets calculated using SPC formulae. Refer SPC formulae.

- Skewness - Value gets calculated using SPC formulae. Refer SPC formulae.
- Kurtosis - Value gets calculated using SPC formulae. Refer SPC formulae.

The number of points displayed in the online chart depends on the value entered for display of online points in the Company Settings screen.
Grid column will vary as per the No of samples and the Grid Row will vary as per the Sample Size. When user move the mouse over the Sample in the chart then the corresponding column of grid gets highlighted.
For all Line Charts: To view details of all actual readings for the samples, use the mouse to move the cursor to the points plotted on the chart. The application will display Sample No., Date, Time, Readings for each reading.

Scroll Buttons are provided for scrolling next or Previous Samples. When user move the mouse over the Sample in the chart then the corresponding column of grid gets highlighted.

Cp/Cpk or Pp/Ppk by Square Root/ RBar/D2 Method –

When Parameter Sampling Technique is sampling then by default 'Cp/Cpk by Square Root Method' checkbox is unchecked and system will calculate Cp/Cpk by Rbar/D2 method. If user checked 'Cp/Cpk by Square Root Method' then system will calculate Cp/Cpk by Square root method. This will get reflected in Statistical Analysis of Capability Indices portion of Cp, Cpk.

When Parameter Sampling Technique is 100% Inspection then by default 'Pp/Ppk by RBar/D2 Method' checkbox is unchecked and system will calculate Pp/Ppk by Square Root method. If user checked 'Pp/Ppk by RBar/D2 Method' then system will calculate Pp/Ppk by Rbar/D2 method. This will get reflected in Statistical Analysis of Capability Indices portion of Pp, Ppk.

Display Cpk or Ppk value in Dashboard for last sample numbers –

When user has configured parameter to Display Cpk or Ppk for last sample then system will display Histogram & Statistical Analysis section based on configured last sample. i.e System will draw the Histogram based on last sample instead of all sample and in statistical analysis section system will Display out of Spec of Above & below, Max Reading, Mean Reading, Min Reading, DPM, skewness, kurtosis based on configured last sample and N (No of reading) will display based on total no of reading.

In Statistical Analysis section system will display label as a 'Statistical Analysis for last – NN sample'

For selected parameter user configure 'Display Cpk or Ppk value' to zero then system will calculate the Cp, Cpk or Pp, Ppk for all sample no and for greater than zero then system will calculate Cp, Cpk or Pp, Ppk based on last sample no. Process Status will also display the color depends upon the Display Cpk or Ppk value in Dashboard for last sample numbers.

On delete operation system will check above condition and do the calculation.

5.4.1.3.1 Angle Parameter –

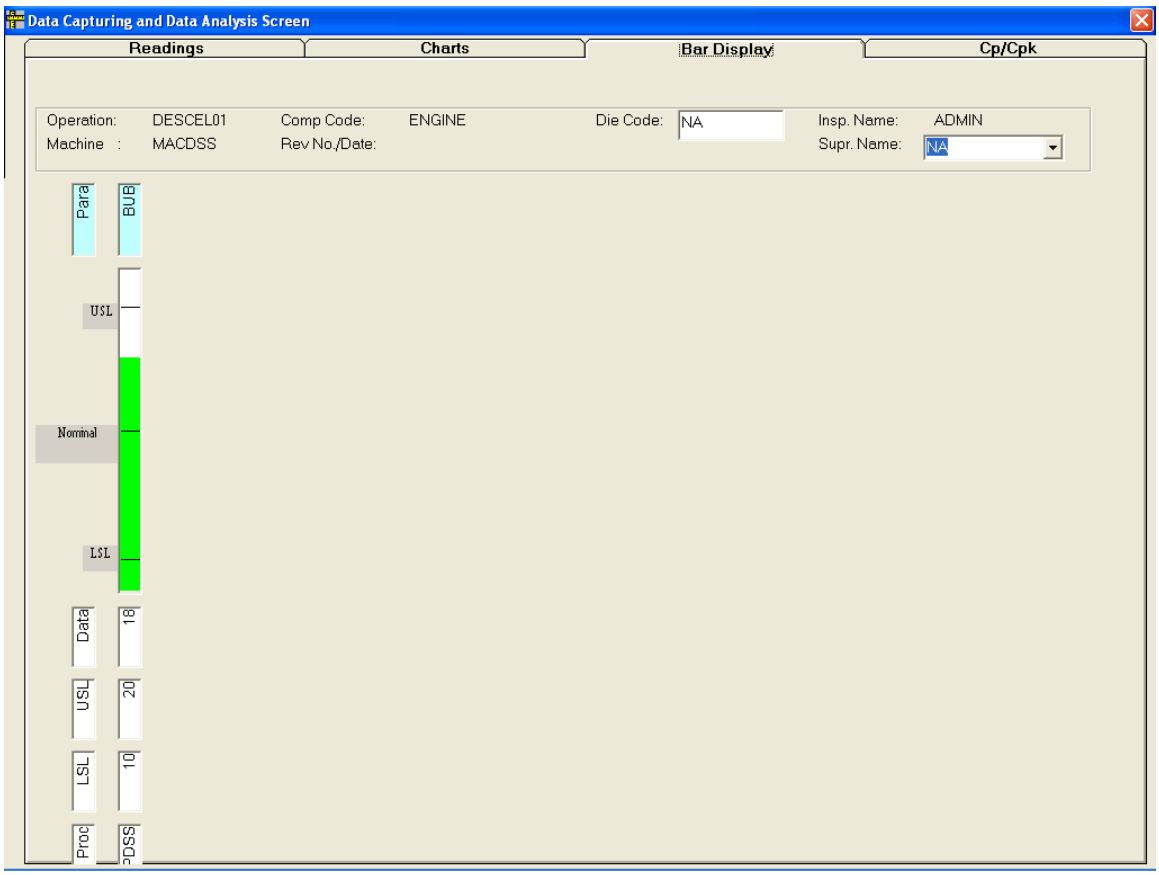
If parameter is of type Angle then user tries to move the mouse pointer on Sample then reading will display in both format i.e. Angle & decimal. This is done for X, X-MR, X Bar R and X Bar S Chart.
In grid all the reading value show in decimal rather parameter UOM is angle or not. If user want to see reading in grid as degree then use has to checked Show Angle checkbox otherwise reading in grid will display in decimal.
In case of Histogram chart & its readings will display in decimal whether parameter UOM is angle or Not & Show Angle checkbox will make visible false.
Print Label as CL in histogram. Value of Centerline will be the Nominal value of that Parameter. Centerline would be red in color and the label would be CL

5.4.1.3.2 Mouse Move Facility on range –

If the online chart displayed is XbarR chart and user user moves the mouse pointer on the sample in Xbar area then for the sample it displays the following details i.e.Sample no, Xbar, Date, time, Readings. If the user moves the mouse pointer on the sample in Range area then for the sample it displays the following details i.e.Sampleno, Rbar, Date, time, Readings.
If the online chart displayed is XMR user moves the mouse pointer on the X area it displays the following details i.e. Reading, Date, and Time. If the user moves the mouse pointer on MR area then it displays the following details i.e. Moving Range, Date, Time

5.4.1.4 Bar Display

Bar Display tab will display one bar for each parameter selected from Local Monitor screen. e.g. If 10 parameters are selected, 10 bars will be displayed. It will display Bar image, Reading, USL, LSL, Parameter and the process vertically (one below the other). If user moves the mouse over the Process then process code - process description will be displayed. If user moves the mouse over Parameter then parameter Code - Parameter Description will be displayed. If user moves the mouse over LSL then LSL Value of respective parameter will be displayed. If user moves the mouse over USL then USL value of respective parameter will be displayed. If user moves the mouse over Reading then Current Reading value of respective parameter will be displayed.



5.4.1.5 Dash Board tab

- If for selected parameter, sampling Technique is 'Sampling' then Tab caption will display 'Cp/Cpk'
- If for Sampling Technique is '100% Inspection' tab caption will display 'Pp/Ppk'
- For mixed parameter tab caption will display 'Cp/Cpk'.

Displaying Cp, Cpk or Pp, Ppk value on button check-

- The Cpk or Ppk value is below of configured Cpk or Ppk value (in trend setting screen) then that button will display in Red color and in feedback Red light will get display.
- The Cpk or Ppk value is above of configured Cpk or Ppk value (in trend setting screen) then that button will display in Green color and in feedback Green light will get display.

Total Parameters to be display –

- If parameter count is greater than entered value in 'Total parameter to be display' textbox then Next button will get enabled.

- If parameter count is less than entered value in 'Total parameter to be display' textbox then Prev & next button will get disabled.
- Maximum 12 parameters will get display.

Based on last sample Xbar, for a parameter respective process status button back color become either Green/Yellow/Red.
If Xbar is with control limit then back color of Process status become green.
If Xbar is greater than control limit but less than specification limit then
Back color of Process status become yellow.
If Xbar is out of Specs limit then back color of Process status become red.

On click of any button on the dashboard except label, display the control chart tab for selected parameter.

Process Status –

Process status will display the color depending upon the Control Limits and Cpk or Ppk value from XBarRSetting.
If Cpk or Ppk value is blank from XBarRSetting then Cpk or Ppk value will be considered as 1.66

In Control means - Within control Limit
Not in Control - Out of control Limit
Capable - Cpk > 1.66
Not Capable - Cpk < 1.66

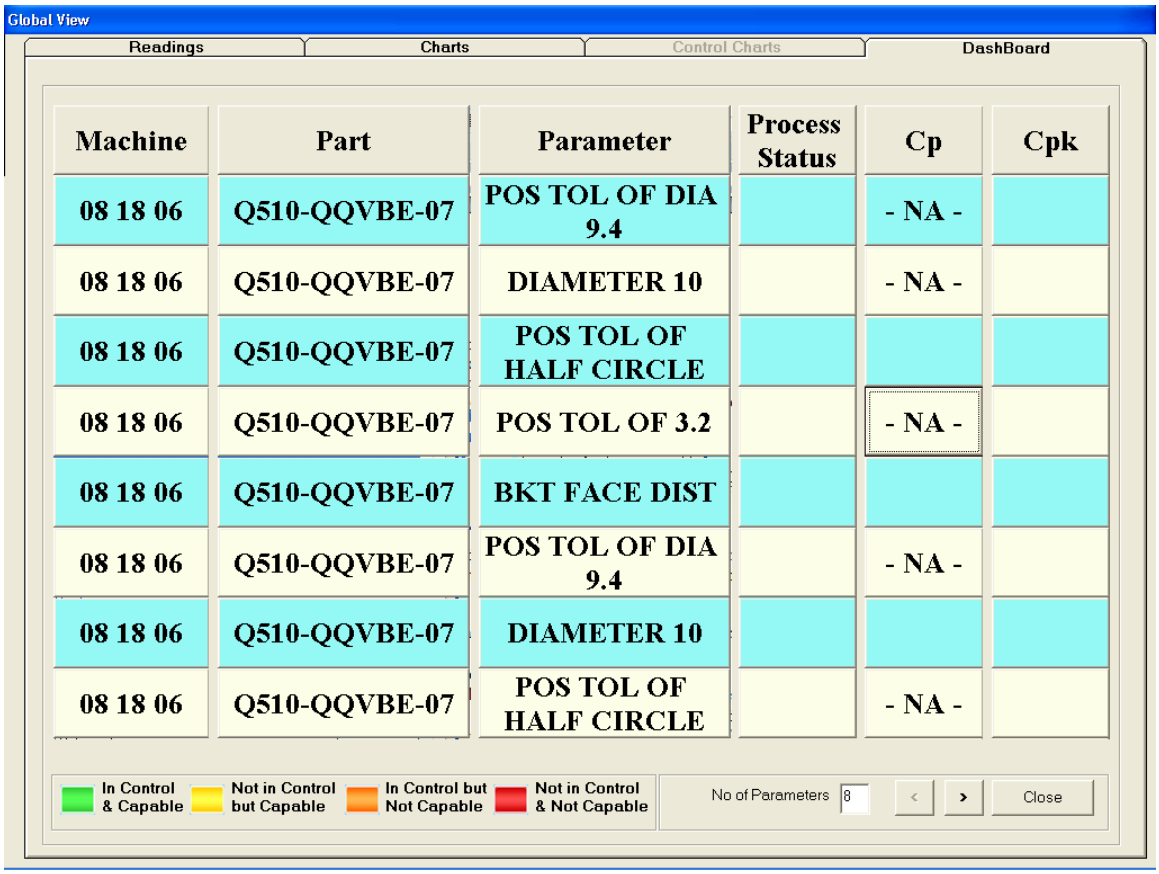
Process Status will have color Green when Process Status is In Control & Capable
Process Status will have color Yellow when Process Status is Not In Control but Capable
Process Status will have color Orange when Process Status is In Control & Not Capable
Process Status will have color Red when Process Status is Not in Control & Not Capable.
Cp, Cpk or Pp, Ppk and Process Status should update after completing sample.

When Parameter is 100% inspection then display the value of Pp, Ppk.
When Parameter is sampling then display the value of Cp, Cpk.
When Parameters are only 100% inspection then display the header as Pp, Ppk.
When Parameters are Sampling and 100% Inspection then display the header as Cp, Cpk.

Display the Legend also at the bottom of the Dashboard Tab.
When user deletes the sample then also updates the Process Status.
In control chart tab display Pp, Ppk if Parameter is 100% Inspection else Cp, Cpk.
For Upper side Parameter display NA for Cp for sampling, NA for Pp for 100% Inspection.

Cp, Cpk or Pp, Ppk Value {Based on Last SampleNo] –

On dashboard Tab, for a parameter 'Display Cpk or Ppk value' to zero then system will calculate the Cp, Cpk or Pp, Ppk for all sample no and for greater than zero then system will calculate Cp, Cpk or Pp, Ppk based on last sample no. Process Status will also display the color depends upon the Display Cpk or Ppk value in Dashboard for last sample numbers.



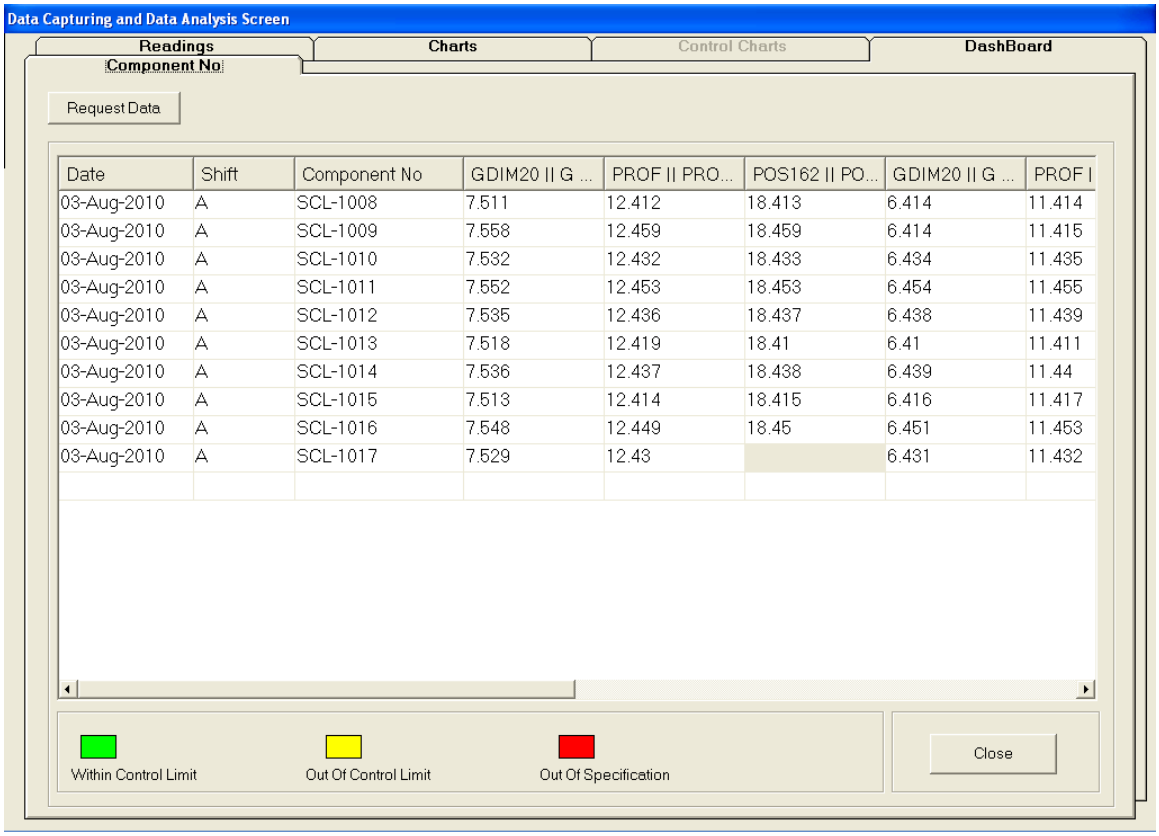
5.4.1.5.1 Cp/Cpk Display on Display Board –

After completion of each sample or after every reading for each parameter Cp, Cpk, Pp, Ppk (whichever is configure in Configurable Parameter) is to be display on display board

5.4.1.6 Component tab

Enter Date, Shift, and component number and for collecting reading of selected Parameters for different jobs in the Component tab. Data can be collected in auto or Manual mode.
While launching measurement screen if (one of the Parameter) reading is incomplete for component number display cycle is incomplete.
While closing measurement screen if (one of the Parameter) reading is incomplete for component number display cycle is incomplete.
Populate the reading as per Company Setting in Component Tab.
If reading is beyond specification limit then display background color of the reading is Red.

Uniqueness for Date + shift + Component Number for selected jobs will be checked.
Reading Date should be greater than or equal to Last Reading Date.
To clear the grid and to display last component number data in the 1st row, press function key F5.User can enter reading for any parameter of the component Number in the grid.
User can select more than one job.
While launching measurement screen user selects more than one job, check same component number is present in all jobs. If component number is not present in all selected jobs then display message 'Different jobs are selected as same component number is not present.' And measurement screen will not get launched.
Request Data button is not displayed in Manual Mode and it gets displayed in Auto mode.
When user enters component number in the grid then Request Data button should get enabled. When user clicks on Request data then data should get dumped into the grid as per the parameter of Instrument address and Request Data button should get disabled.
After capturing reading for all parameter then next row should get added in the grid.
Request should stop after all parameters readings are stored. Request should happen after 5 second if some of the parameters reading are pending.
In auto mode user cannot edit the reading.
Component No Tab will be displayed only when component number Flag is true.
In x-chart when user moves the mouse pointer on reading display Component number along with reading.



Following validation or steps will be done when g_BreakIndia flag is true.

Grid contains following columns Date, Component No, Machining Tracking Number and two parameters i.e. Top and Bottom and last column is position.
Date, Component No and Machining tracking Number will be entered by user.
Date+Component Number is unique. Component will be checked at 4^{th} positions.
User has to check component serially i.e. position-wise. 1st, 2nd, 3rd & 4th.

When user checks the component at position 1 then in component tab displays the value of Top and Bottom in the respective column of the grid and in the position column value will display as 1. In reading tab display the value of Top and bottom in Top1 and Botom1 parameter.
When user checks the component at position 2 then in component tab displays the value of Top and Bottom in the respective column of the grid and in the position column value will display as 2. In reading tab display the value of Top and bottom in Top2 and Bottom 2 parameter.
When user checks the component at position 3 then in component tab displays the value of Top and Bottom in the respective column of the grid and in the position column value will display as 3. In reading tab display the value of Top and bottom in Top3 and Botom3 parameter.
When user checks the component at position 4 then in component tab display the value of Top and Bottom in the respective column of the grid and in the position column value

will display as 4. In reading tab display the value of Top and bottom in Top4 and Botom4 parameter.

After saving the value of parameter Top4 and Botom4, system will calculate the value of Top parameter is (Top1+Top2+Top3+Top4)/4 and the value of Bottom parameter is (Botom1+Botom2+Botom3+Botom4)/4

After calculating the value of Top and Bottom, in component grid display the calculated value in Top and Bottom column of the parameter and display blank in Position column and system will add one row with current date, in date column and cursor should wait on component No. column.

If Component number, machine tracking number or Date is not assigned and user tries to press the switch for collecting data, ignore the reading and put in the log file.

Suppose user has checked the component number at 1st position and user tries to close the measurement screen then system should display the message as Cycle has not completed Do you want to continue? . If user presses No then system will close the measurement screen.

If user press 'Yes' then Measurement screen will not get closed. So that user can continue to check the component.

Suppose user has checked component no. at position 1 and closed the measurement screen. User has selected the job from local monitor as per stated above and launched the measurement screen. System will display the message 'Cycle is not completed' and the value of Top and Bottom will display which was taken earlier and position column will display value as 1. Now user has to check the component at position 2 and cycle will continue.

Display the background color of the cell is depending upon the reading.

If reading is beyond the specification then display the color as Red.

If reading is out of control limit and within the Specification limit then background color of the cell is Yellow.

If reading is within control limit then background color of the cell is Green.

As per the company settings configuration, grid will display those many rows in the component grid. System will refresh the grid when rows are equal to the company setting configuration.

To clear the grid press function keys F5 and display the 1st row value with last component number.

Provide check box to display all parameters in case of auto mode. By default when user tries to launch measurement screen in auto mode display only two parameters and position along with Date, Component No and Machining tracking number when instrument interface is DEWTRT2. If instrument interface is not DEWTRT2 then display all parameters in the component tab.

When user selects all parameters check box, and then system displays all parameters along with Date, component number and machining tracking number. Do not display Position column.

If component number is not assigned then user can do manual entry in the Reading tab.

If component number is not assigned then also user can take reading in auto mode of Reading tab.
In manual mode display all parameters in component grid so that user can do manual entry.
If component number is assigned then user cannot do entry in Reading tab.
If component number is not assigned , sample number and reading serial number is not same for all parameter and user tries to enter the data in component tab display message ' Sample Number and Reading serial number is not same for all parameter.

Machining tracking Number columns can be seen only when Breaks India flag is true.
Shift column can be seen only when SClPrefix flag is true.

When Breaks India flag is false and SclPrefix flag is false then in component tab user can see Date, Component Serial Number and all parameters sequentially.

Deletion Facility -
When component Number flag is assigned then deletion facility should be disabled from Measurement screen. If the user press F6 key then the application displays message as 'Cannot Delete, Component number is assigned'.

Calculate Control Limit (g_CalCtrlLimit = True)
When g_CalCtrlLimit flag is true and user has configured No of samples for limit calculation and Repeated Calculation is 'Y' for a parameter then while updating or deleting the sample system will calculate the control limit based on last No of samples for limit calculation.

E.g. Current sample is 123 and No of samples for limit calculation is 25 then system will calculate the control limit based on 76 to 100 samples. When 125th Sample finish then system calculates the control limits based on 120 to 125 samples.

When g_CalCtrlLimit flag is false and user has configured No of samples for limit calculation and Repeated Calculation is 'Y' for a parameter then while updating or deleting the sample system will calculate the control limit based on all samples i.e. multiples of No. of samples for limit calculation.

E.g. Current sample is 123 and No of samples for limit calculation is 25 then system will calculate the control limit based on 1 to 100 samples. When 125th Sample finish then system calculates the control limits based on 1 to 125 samples.

When user Deletes or Update readings from Global Monitor screen and g_CalCtrlLimit flag is true, Repeated Calculation is 'Y' then system should calculate the control limits based on last No of samples for limit calculation. When g_CalCtrlLimit is false then system will consider all samples i.e. multiples for the No of samples for limit calculation.

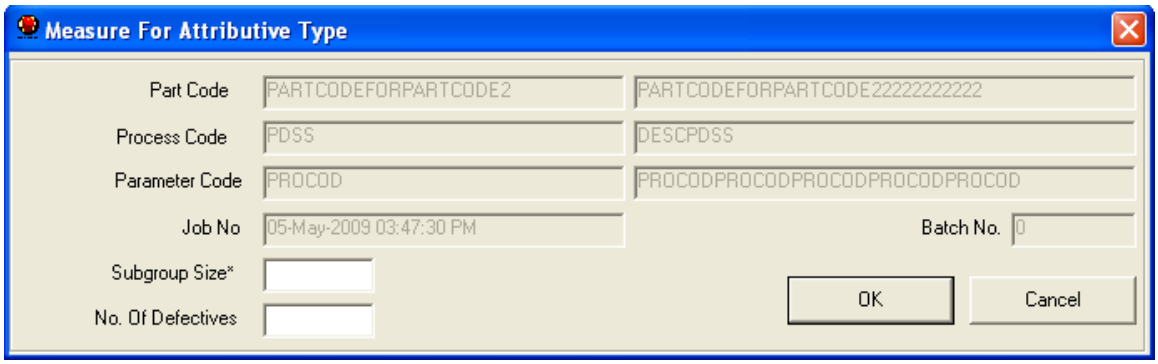
System will calculate control limit for XBarS, XMR chart based on last No of samples for limit calculation, g_CalCtrlLimit is true & Repeated Calculation is 'Y' same control limit system will use while plotting the XBarS, XMR chart.

ELGI Instrument –

In measurement screen, when parameter has instrument which is having instrument interface is ELGI and data gets from the instrument then system extracts instrument address from the reading and dumps the data to parameter which is having same instrument address. If instrument address is not found for the selected jobs then system writes in the Log file Instrument address 99 is not available in a job.

5.4.2 Measurement Of Attributive Parameters

If the **Parameter Type** has been defined as **Attribute** then you may collect the data in the form of **No. Of Defectives** or **No. Of Defects**. Click on Measure button to display Measure For Attributive Type *screen.*



This screen displays **Part**, **Process**, **Parameter**, **Job No.**, **Batch No.** (set to 0) and **Subgroup Size** for selected Job and Parameter. If **Subgroup Size** entered in *Work Order QAP* for that particular parameter is greater than 0 then **Subgroup Size** field will be disabled. Otherwise **Subgroup Size** will be enabled and you may enter the value for **Subgroup Size**.

If the charts selected for the particular Parameter are nP or P or both (P and nP) then the label will be **No. Of Defectives**. If chart selected are C or U or both (C and U) then the label will be **No. Of Defects**. On the click of **OK** button readings will be saved to database.

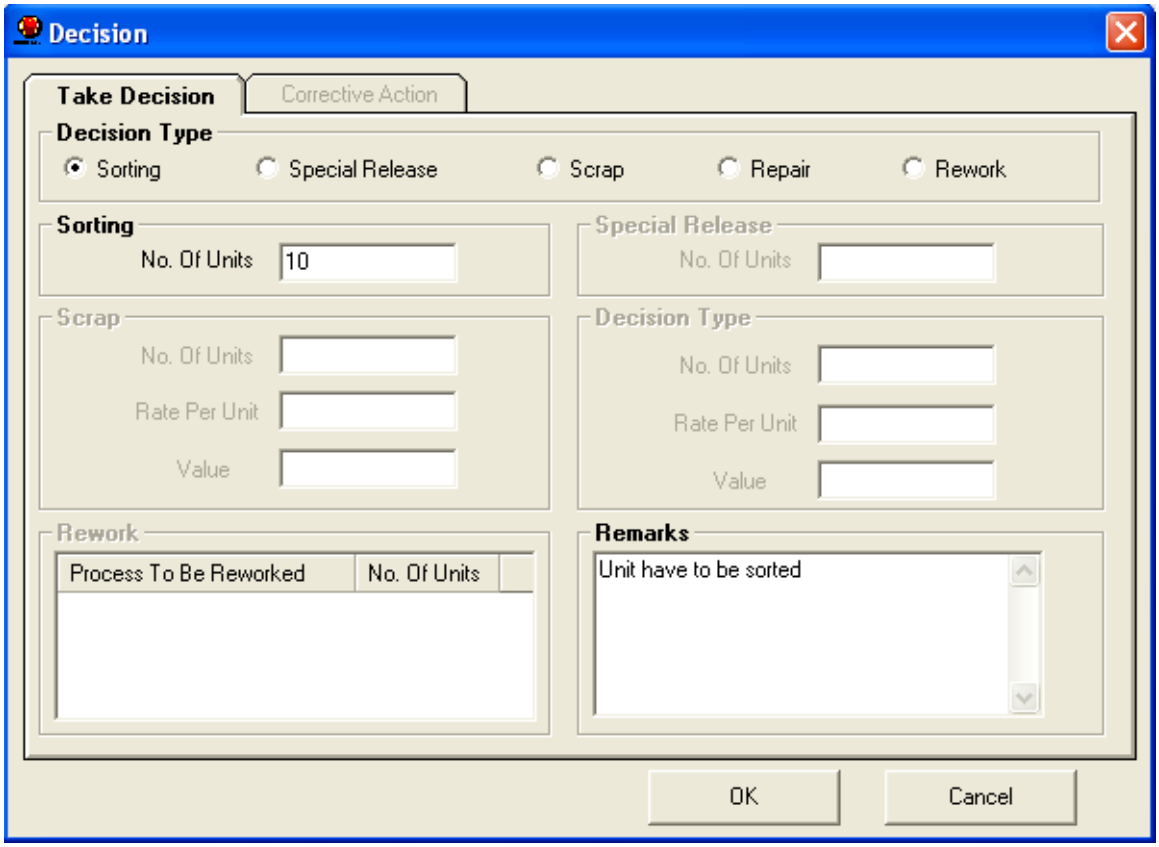
5.5 Decisions

Use the *Decisions* screen to maintain detailed information about online and offline decisions taken for readings which are out of control limits. There are two tabs: the *Take Decision* tab and the *Corrective Action* tab.
At the time of manual recording of readings, in the *Local Monitoring* screen you may take online decisions. If level two trend is raised and the readings are out of specification limits, you must take a decision and corrective action immediately. If level one trend is

raised and the readings are out of control limits/runs up mean then you must take corrective action immediately.
In the *Local Monitoring* or *Global Jobs* screen:

- Click **Take Decision** on the *Pending Decisions* tab to enter decisions offline.
- Click **Corrective Action** on the *Pending Corrective Action* tab. to enter corrective actions offline.
- Click **Take Decision** on the *Sorting Analysis* tab to enter decisions offline.

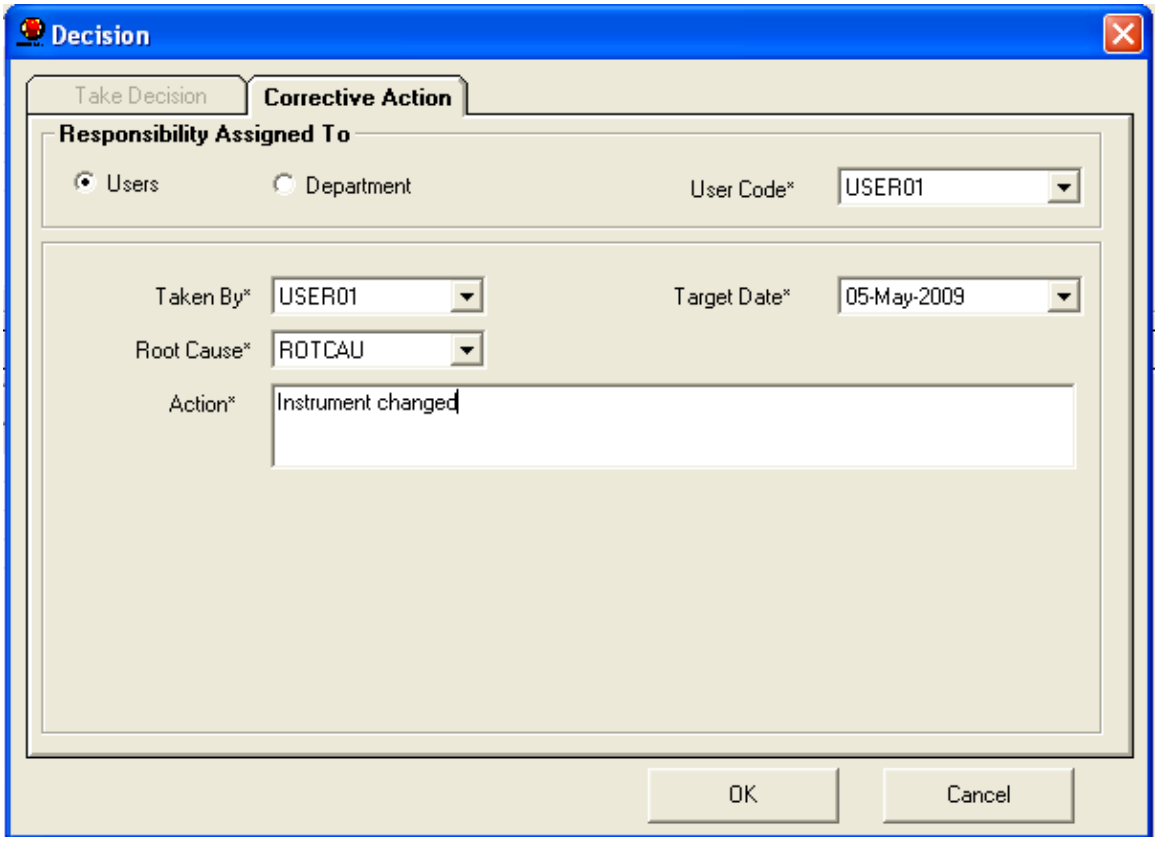
5.5.1 The Take Decision Tab



Specify the **Decision Type** – whether *Sorting*, *Special Release*, *Scrap*, *Repair* or *Rework.*
Before you define a decision type, there must be a related record in the *Part-Machines* master for the job.
If decision type is *Sorting*, enter **No. Of Units** in the **Sorting** frame.
If decision type is *Special Release*, enter **No. Of Units** in the **Special Release** frame.
If decision type is *Scrap*, enter **No. Of Units** in the **Scrap** frame. **Rate Per Unit** is displayed from the *Machine* master. **Value** is displayed as **No. Of Units** * **Rate Per Unit**.
If decision type is *Repair*, enter **No. Of Units** in the **Repair** frame. **Rate Per Unit** is displayed from the *Machine* master. **Value** is displayed as **No. Of Units** * **Rate Per Unit**.
If decision type is *Rework*, all processes from the Work Order QAP Process table are displayed in the **Rework** frame. Enter **No. Of Units**.
Enter **Remarks**, if any. Click **OK** to save.

After records are saved, they do not appear under the *Pending Decisions* tab of *Local Monitoring* and *Global Jobs* screen. When the decision taken is *Sorting*, the record is displayed under the *Sorting Analysis* tab of *Local Monitoring* and *Global Jobs* screen.

5.5.2 The Corrective Action Tab



Specify whether the **Responsibility for the Corrective Action** is assigned to *User* or *Department.* Select **User/Department** from the drop down list which displays related values. Select the actual user who takes the corrective action from the drop down list in the **Taken By** field. Select **Target Date** by which corrective action is to be taken. Select **Root Cause** from the drop down list. Enter the **Action** taken. Click **OK** to save.

Please note:

If *Sorting Analysis* tab of *Local Monitoring* or *Global Jobs* screen is active, the *Take Decision* tab is launched with the **Sorting** frame disabled. You can enter details for the other four **Decision Type**s. The total **Number Of Units** in the **Special release, Scrap, Repair** and **Rework** frames must not be greater than the **Number Of Units** displayed in the **Sorting** frame. The *Corrective Action* tab is disabled.

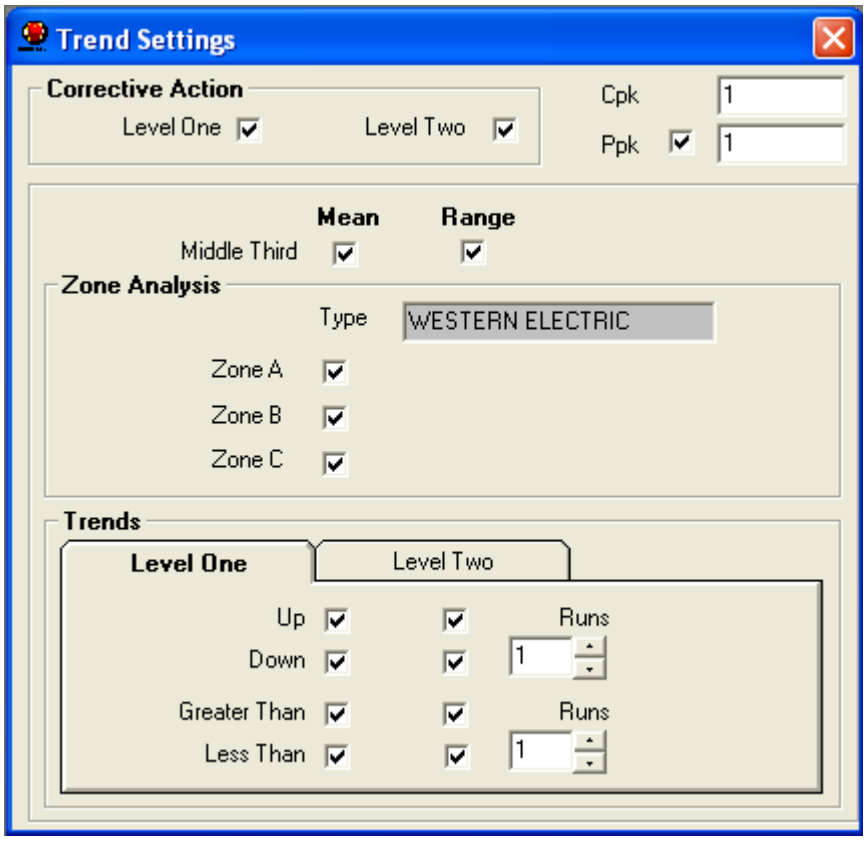
At the time of manual recording of readings, in the *Local Monitoring* screen:

In case of manned configuration, if corrective action is compulsory at level one is checked or corrective action is compulsory at level two is checked or both are checked then you must take both decisions and corrective actions immediately. The *Decision* screen is launched with both tabs enabled. If you take a decision, but do not enter

corrective action details, you are prompted that "Corrective action has not been taken for the decision".

5.6 Trend Settings

If Trend Analysis is included in the product installed, then click on option, select the settings menu and select trend setting, the screen displayed is as below



Check the box against Ppk if you wish to consider it for Trend Settings.
The trend control checks can be enabled for the mean and/or the range charts by clicking the appropriate check box. If a trend control check is enabled, the size of the trend as the number of consecutive points must be specified via the spin box next to the check boxes. Trend control checks provide a way to determine the out of control status of a sample. There are three types of control checks: **Points Outside Control Limits, Trend Analysis and Zone Analysis**
The Runs **Up** and Runs **Down** checks must share the same trend size as to the Runs **Greater Than** Mean and Runs **Less Than** Mean Checks.

- **Error Code Entry –** This checkbox is used to enable the display of *Corrective Action* screen so that the operator can take the corrective action when any trend is raised during data collection.
- **Points Outside Control Limits –** You may check this option for Mean and/or range to raise a trend if the sample just collected lie outside the control limits but within the specification limits.

- **Middle Third –** You may check this option for Mean and/or Range to raise a trend whenever more than two thirds of the mean of the sample just collected and the mean's/range's of all previous samples collected are within a one sigma spread about the center line of the Mean/Range chart.
- **Zone A –** You may check this option for Mean chart, to raise a trend if consecutive 2 of 3 samples lie in Zone A+ or above/Zone A- or below. You may check this option for Range chart, to raise a trend if consecutive 2 samples lie in Zone A+ or above, or if consecutive 4 samples lie in Zone A- or below.

Zone B – You may check this option for Mean chart, to raise a trend if consecutive 4 of 5 samples lie in Zone B+ or above/Zone B- or below. You may check this option for Range chart, to raise a trend if consecutive 3 samples lie in Zone B+ or above, or if consecutive 6 samples lie in Zone B- or below.

Zone C – You may check this option for Mean chart, to raise a trend if consecutive 8 samples lie in Zone C+ or above/ Zone C- or below. You may check this option for Range chart, to raise a trend if consecutive 10 samples lie in Zone C- or below, or if consecutive 7 samples lie in Zone C+ or above.

Up – You may check this option for Mean/Range chart to raise a trend if the mean/range is increasing for consecutive no of samples as specified in the Trend Size.

Down – You may check this option for Mean/Range chart to raise a trend if the mean/range is decreasing for consecutive no of samples as specified in the Trend Size.

Greater Than – You may check this option for Mean/Range chart to raise a trend if the mean/range of the current sample and all the previous consecutive no of samples as specified in the Trend Size, lie above the centre line.

Less Than – You may check this option for Mean/Range chart to raise a trend if the mean/range is of the current sample and all the previous consecutive no of samples as specified in the Trend Size, lie below the centre line.

For **Up, Down, Greater Than** and **Less Than** options two levels viz. **Level 1** and **Level 2** are present.

5.7 Points Outside Control Limits

This control check is violated for the mean chart whenever the mean of the sample just collected falls above the current upper control limit for the mean chart or falls below the current lower control limit for the mean chart.
This control check is violated for the range chart whenever the range of the sample just collected falls above the current upper control limit for the range chart or falls below the current lower control limit for the range chart.

5.8 Trend Analysis

Trend Analysis screen is used to raise the trends for X Bar R charts, in measurement screen.
Trend analysis checks for the following trends:

Runs Up
The Runs Up trend control check is violated for the mean chart whenever the mean of the sample just collected is greater than mean of the previous sample. Size of the trend is specified in the spin box. If size of the trend is 3, then if mean of the last three consecutive samples is up then trends Runs Up will get raised for mean chart.
The Runs Up trend control check is violated for the range chart whenever the range of the sample just collected greater than range of the previous sample. Size of the trend is specified in the spin box. If size of the trend is 3, then if range of last three consecutive samples is up then trends Runs Up will get raised for range chart.

Runs Down
The Runs Down trend control check is violated for the mean chart whenever the mean of the samples just collected less than mean of the previous sample. Size of the trend is specified in the spin box. If size of the trend is 3, if last three consecutive samples are down then trends Runs Down will get raised for mean chart.
The Runs Down trend control check is violated for the range chart whenever the range of the samples just collected less than range of the previous sample. Size of the trend is specified in the spin box. If size of the trend is 3, if last three consecutive samples are down then trends Runs Down will get raised for range chart.

Runs Greater Than
The Runs Greater Than mean trend control check is violated for the mean chart whenever the mean of the sample just collected, and the mean of the previous samples, all lie above the current center line of the mean chart. Size of the trend is specified in the spin box. If size of the trend is 3, if last three consecutive samples are lie above the current centerline of the mean chart then trends Runs Greater than Mean will get raised for mean chart.
The Runs Greater Than Mean trend control check is violated for the range chart whenever the range of the sample just collected, and the range of the previous samples, all lie above the current centerline of the range chart. Size of the trend is specified in the spin box. If size of the trend is 3, if last three consecutive samples are lie above the current center line of the range chart then trends Runs Greater Than Range will get raised for range chart.

Runs Less Than
The Runs Less Than mean trend control check is violated for the mean chart whenever the mean of the sample just collected, and the mean of the previous samples, all lies below the current center line of the mean chart. Size of the trend is specified in the spin box. If size of the trend is 3, if last three consecutive samples are lie below the current centerline of the mean chart then trends Runs Less Than Mean will get raised for mean chart.
The Runs Less Than range trend control check is violated for the range chart whenever the range of the sample just collected, and the range of the previous samples, all lies below the current centerline of the range chart. Size of the trend is specified in the spin box. If size of the trend is 3, if last three consecutive samples are up and all lies below the current centerline of the range chart then trends Runs Less Than Range will get raised for range chart.

5.9 Example for Level 1 & Level 2

Level 1 - Runs Up is checked for mean chart and size of the trend is 3.

Level 2 – For Second level the size of the trend should be greater than the first level of the trend size. If Runs Up is checked for mean chart and size of the trend is entered less than or equal to 3 then it will display the message ' Runs Up and Runs Down should be greater than 3', because in first level size of the trend is 3.

This is valid for all trends like Runs Down, Greater than Less than Mean/Range. In this application 2 levels are used. Depending upon the selection of levels trends is raised.

E.g. In First level Runs Up is checked and size of the trend is 3
In Second level Runs Up is checked and size of the trend is 5.

Following two cases are explained depending upon the above example.
Case - 1
If last three consecutive samples are **UP** then trend will get raised as '**Runs up violated for mean chart at level 1 for parameter** height', Operator has not taken the corrective action for the same trend. Operator is dumping the reading and the next two samples are also up then trends will be raised as '**Runs up violated for mean chart at level 2 for parameter** height' and then the login screen will come. Here only supervisor can login. Operator has to call up supervisor and after successful of supervisor login, it will show the corrective Action screen so here Supervisor has to take the corrective action for the same trend then only operator can continue to take the readings and here the trends will get reset.
Case - 2
If last three consecutive samples are **UP** then trend will get raised as '**Runs up violated for mean chart at level 1 for parameter** height', Operator has taken the corrective action for the same trend. Then the trends for same will get reset. Operator is dumping the reading and the next two samples are also up then Trends will not be raised as '**Runs up violated for mean chart at level 2 for parameter** height' because the operator has already taken the corrective action at first level only.

If the operator has taken the corrective action at first level only then second level trend will not be get raised.
Second level trends will get raised only when operator has not taken the corrective action at level one and the next two consecutive samples are up for mean i.e. depending upon the selection of the trend size.
First level trends have been raised and the operator has not taken the corrective action and the next consecutive sample is not runs up then the trends for up will be get reset.

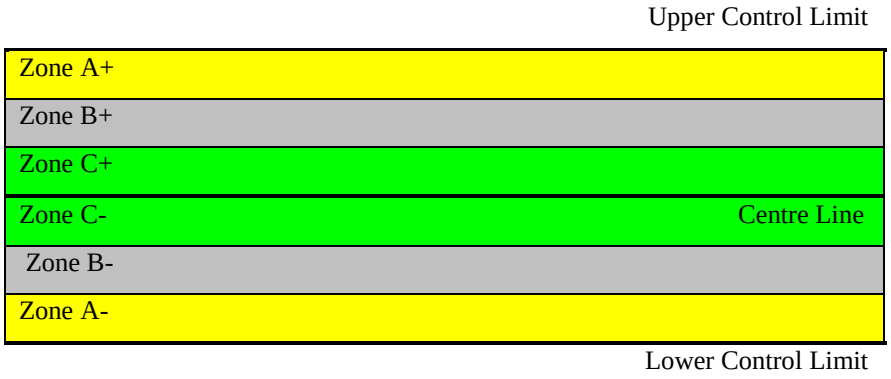
Above cases are also valid for all the trends like Runs Down, Greater than Mean, Less Than Mean if the option is checked in Trend Settings.

5.10 Middle Third Rule

The Middle Third control check is violated for the mean chart whenever more than two thirds of the mean of the sample just collected and the means of all previous samples collected are within a one sigma spread about the center line of the mean chart. The Middle Third control check is violated for the range chart whenever more than two thirds of the mean of the sample just collected and the ranges of all previous samples collected are within a one sigma spread about the center line of the range chart. The spread between the current upper and lower control limits of the mean and range chart is 6 sigma wide; therefore the plus and minus one sigma spread about the centerline designates the middle third region of a control chart.

5.11 Zone Analysis

As described in the discussion of the **Middle Third Rule**, the spread between the current controls limits of a mean or range chart can be divided into 6 zones each zone being one sigma wide
Zones C are the zones closest to the centerline; zones C+ and C- constitute the middle third region of the control chart. Zones A are the zones closest to the chart control limit. The zone between zone C and zone A comprises of Zone B. Zone Analysis is based on the Western Electric Zone Analysis method.



Zone A -
Zone A for Mean Chart –
If consecutive 2 of 3 samples lie in Zone A+ or above then trends will get raised as 2 of every 3 samples in zone A+ or above.
If consecutive 2 of 3 samples lie in Zone A- or above then trends will get raised as 2 of every 3 samples in zone A- or below

Zone A for Range Chart –
If consecutive 2 samples lie in Zone A+ then trends will get raised as 2 samples in a row in zone A+ or above
If consecutive 4 samples lie in Zone A- then trends will get raised as 4 samples in a row in zone A- or below

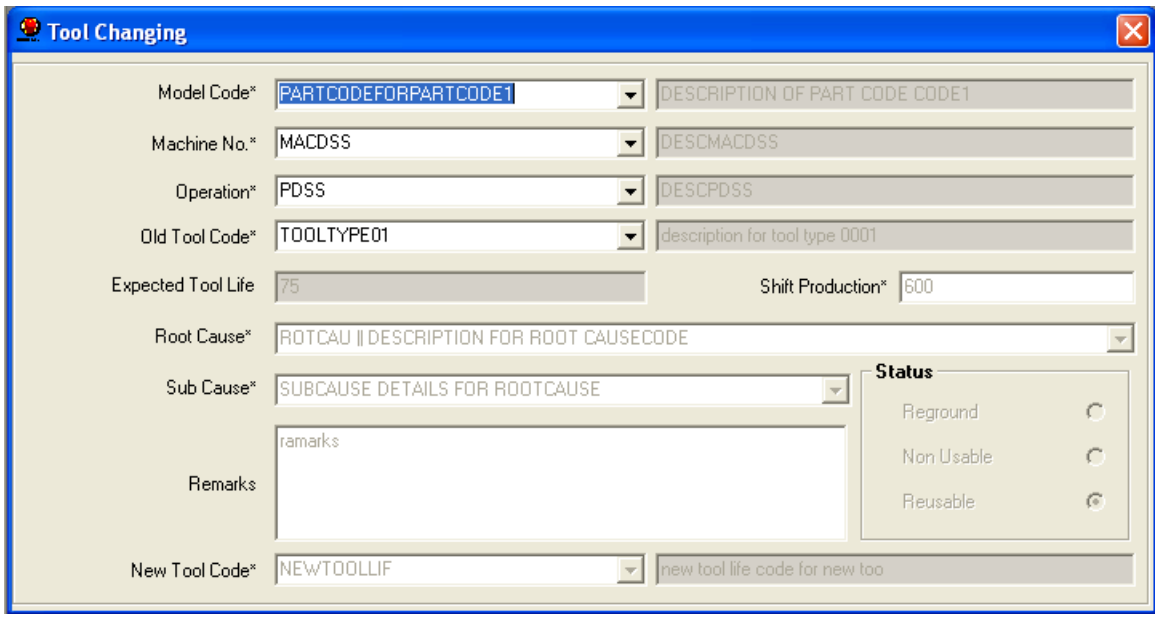
Zone B -
Zone B for Mean Chart –
If consecutive 4 of 5 samples lie in Zone B+ or above then trends will get raised as 4 of every 5 samples in zone B+ or above
If consecutive 4 of 5 samples lie in Zone B- or below then trends will get raised as 4 of every 5 samples in zone B- or below

Zone B for Range Chart –
If consecutive 3 samples lie in Zone B+ or above then trends will get raised as 3 samples in a row in zone B+ or above
If consecutive 6 samples lie in Zone B- or below then trends will get raised as 6 samples in a row in zone B- or below

Zone C -
Zone C for Mean Chart –
If consecutive 8 samples lie in Zone C+ or above then trends will get raised as 8 samples in a row in zone C+ or above
If consecutive 8 samples lie in Zone C- or below then trends will get raised as 8 samples in a row in zone C- or below
Zone C for Range Chart –
If consecutive 10 samples lie in Zone C- or below then trends will get raised as 10 samples in a row in zone C- or below
If consecutive 7 samples lie in Zone C+ or above then trends will get raised as 7 samples in a row in zone C+ or above.

5.12 Tool Change Corrective Action screen

While taking readings through fixtures, trends may be raised. If a trend is raised then the user has to take a corrective action based on the settings done in the *Trend Settings screen*. In the *Corrective Action for Trends screen*, if you select the **Root Cause** as TC – Tool Change, then after the close of the *Corrective Action For Trends* screen, the *Tool Change* screen is launched. Tool change screen is displayed below.



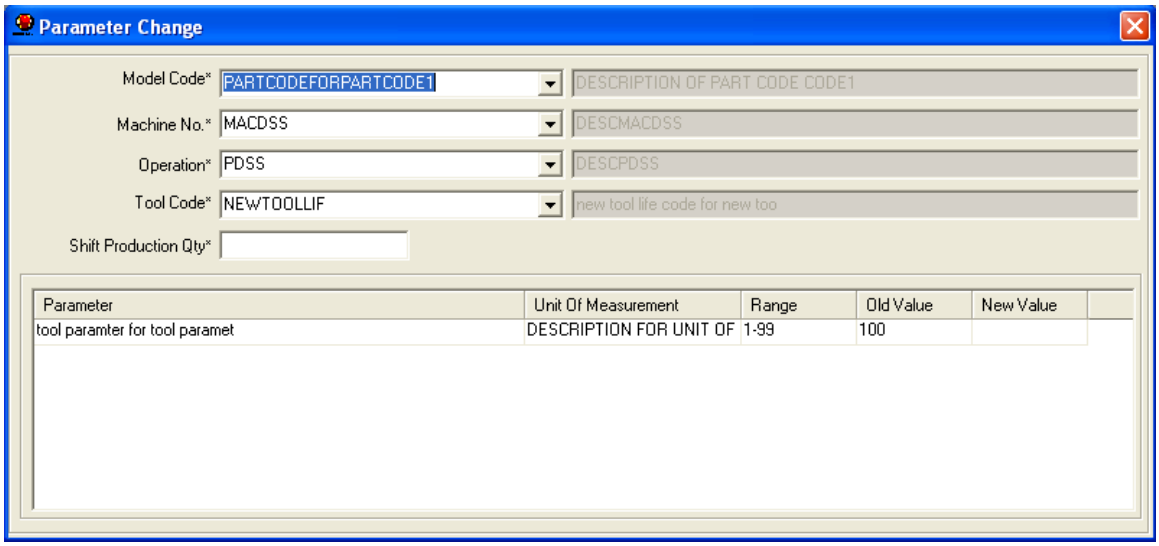
You can change the tool(s) from this screen by clicking the **Add** button. Data for **Model Code**, **Machine No.** and **Operation** is retrieved from the Job for which the measurements are being taken. Select the **Old Tool Code**, enter the quantity produced by the **Old Tool Code** during the current shift in the **Shift Production** text box, select the **Status** for the **Old Tool Code** and select the new tool code from the **New Tool Code** drop down list box. If the required **New Tool Code** is not present in the drop down list box, then you can directly type the code and description for the **New Tool Code** in the drop down list box and the adjoining textbox respectively. You can save the record by clicking the **Save** button, or click the **Cancel** button to cancel the adding of the record. You can close the screen by clicking on the **Close** button.

If the status of the **Old Tool Code** has been selected as **Reground** and the **Old Tool Code** has already been reground for the optimum no of times as mentioned in the *Tool Type* screen, then a confirmation message shall be displayed stating that the tool has exceeded the optimum no of reground, do you want to continue with reground.

If the status of the selected **New Tool Code** is **Reground** in the *Tool Master* screen, the **Reground Serial No** for the tool shall be incremented by one. If there are no records for the new reground no's expected tool life and alert quantity in the *Model Tool Link* screen, then you shall be prompted to enter the expected tool life and alert quantity for the reground serial no. The entered expected tool life should be less than or equal to previous reground Serial No from *Model Tool Link* screen for that **Model**, **Machine No**, **Operation**, **Tool Type Code**. The alert quantity, should be less than or equal to its corresponding expected tool life just entered for the new tool code, reground serial no. Modify and Delete functionality is not applicable in this form.

5.13 Tool Parameter Change corrective action screen

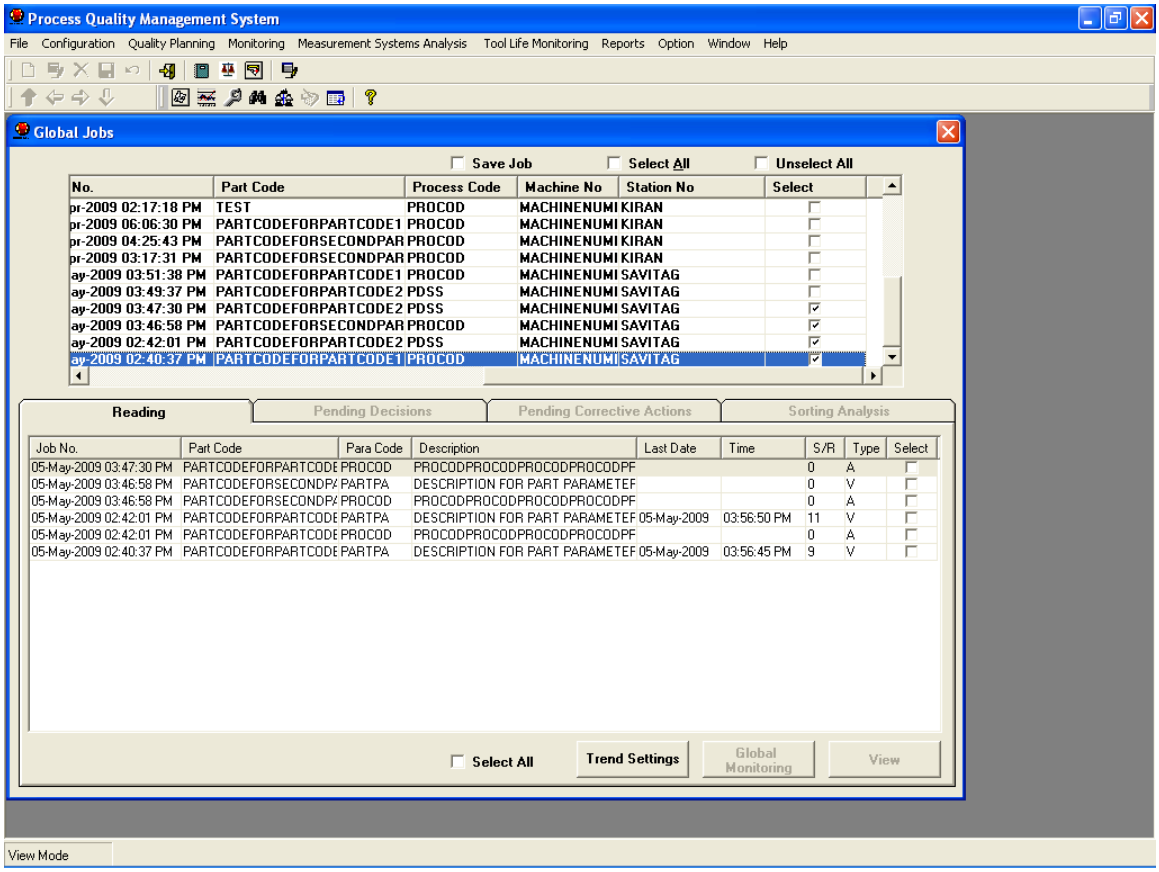
While taking readings through fixtures, trends may be raised. If a trend is raised then the user has to take a corrective action based on the settings done in the *Trend Settings* screen. In the *Corrective Action for Trends* screen, if the user selects the **Root Cause** as TPC – Tool Parameter Change, then after the close of the *Corrective Action For Trends* screen, the *Tool Parameter Change* screen is launched. Tool Parameter change screen is displayed below.



You can change the operating parameter values through this screen. Data for **Model Code**, **Machine No** and **Operation** is retrieved from the Job for which the measurements are being taken. Select the **Tool Code** for which the operating parameter values are to be changed and then clicking on the **Modify** button. The grid on the screen displays the **Parameter**, along with **Unit of Measurement**, **Range**, **Old Value** and **New Value**. Enter the quantity produced by the tool during the current shift, in the **Shift Production Qty** textbox. Enter the new parameter value for one or all the parameters for the tool. The **Old Value** column displays the current parameter value; the new value for the parameter has to be entered in the **New Value** column. If the **New Value** entered is not within the range specified for the parameter, then message shall be displayed stating 'New value is not within the range. Do you want to accept?'. Save the **New Value** by clicking on the **Save** button. The **Old Value** for the parameter shall be updated with the **New Value** that was entered. If the **New Value** entered is within the range of the parameter, then on saving the **Old Value** shall be updated without displaying any message.

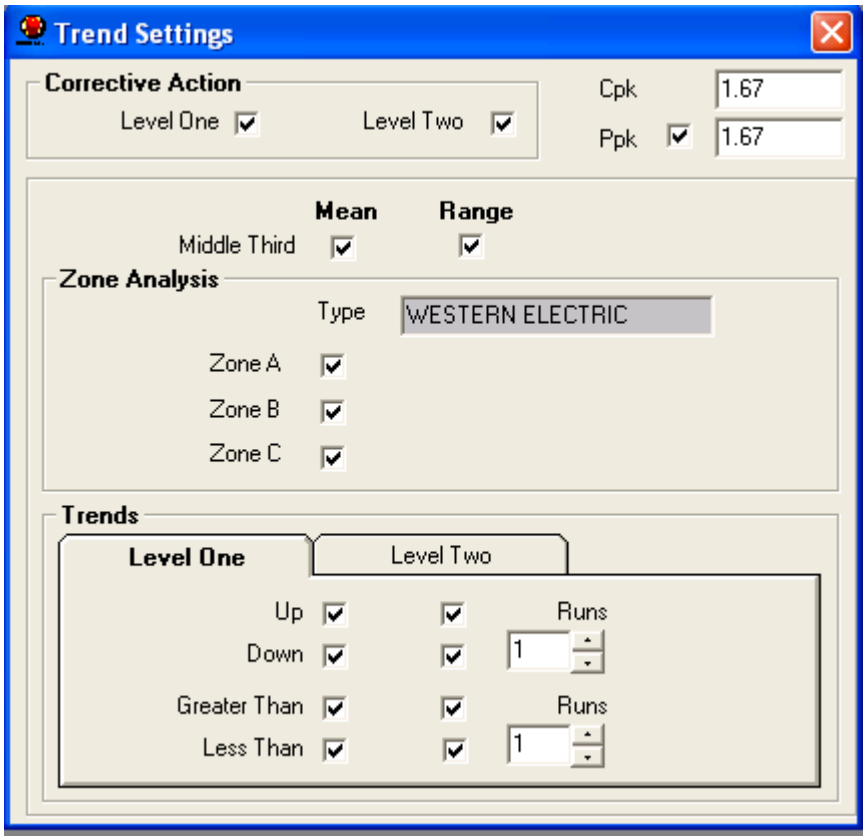
5.14 Global Jobs

Global Jobs shows the same set of information as *Local Monitoring* but global shows all the jobs irrespective of the workstation. You may select a job from the upper grid on the *Global Jobs* screen and then select a parameter for which data is being collected. Click on monitoring menu and select global monitoring to display global job screen. The screen below displays the *Reading* tab.

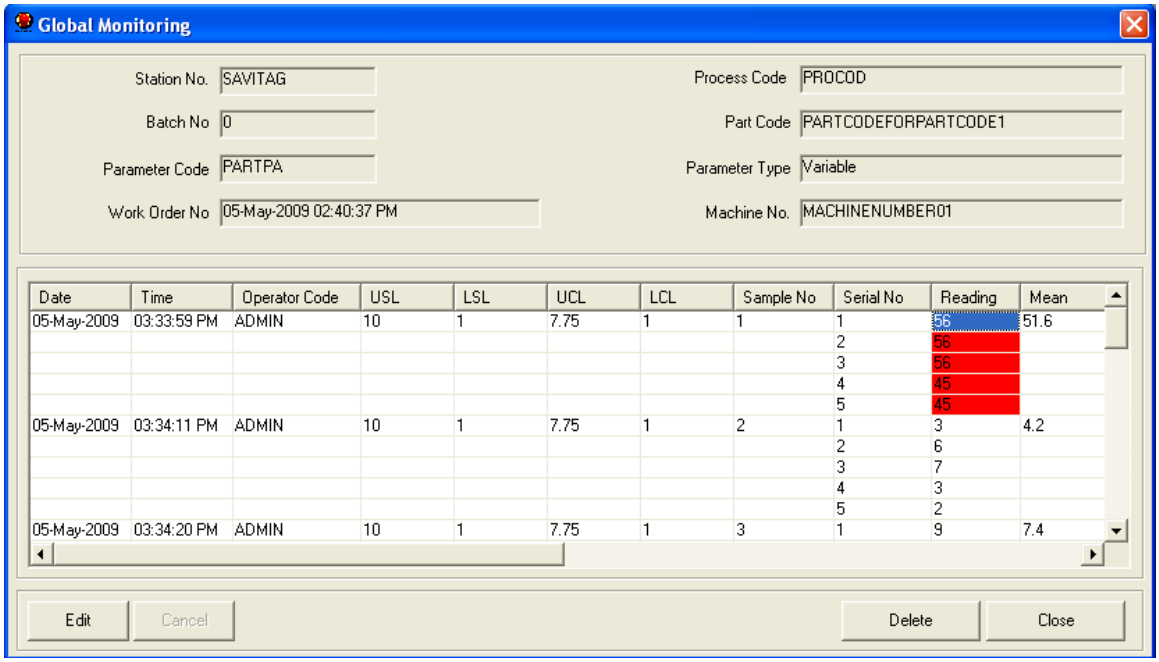


Grid under Reading tab (i.e. Parameter grid) will display the details such as Job No., *Part Code*, *Parameter* Code, its Description, Last Sample Date and Last Sample Time, No. of Samples/Readings and Type for all parameters defined for all selected Job. If parameter type is Variable then type will be V. If parameter type is Attributive then type will be A. All checkboxes for all parameters in the Parameter grid will be unchecked by default. User will be allowed to select more than one variable type of parameters by checking the checkboxes for required parameters before clicking on View button. This multi select property is not applicable for attributive type of parameters.
If the parameter selected is having Pre control Chart set from WoQap/Job Creation then multi-selection of parameters for measurement is applicable.

Click **Trend Settings** to display the *Trend Settings* screen.



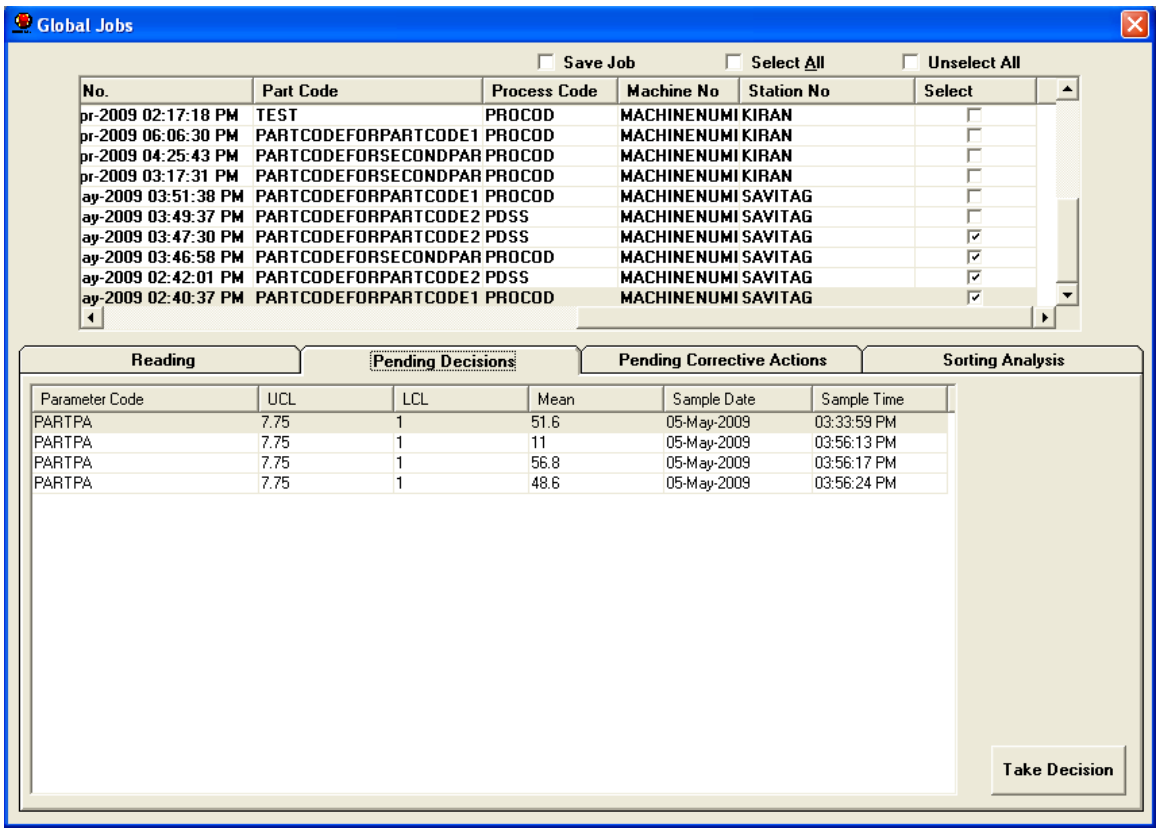
You can select the job and parameter from Global Jobs screen and click **Global Monitoring** to launch the *Global Monitoring* screen.



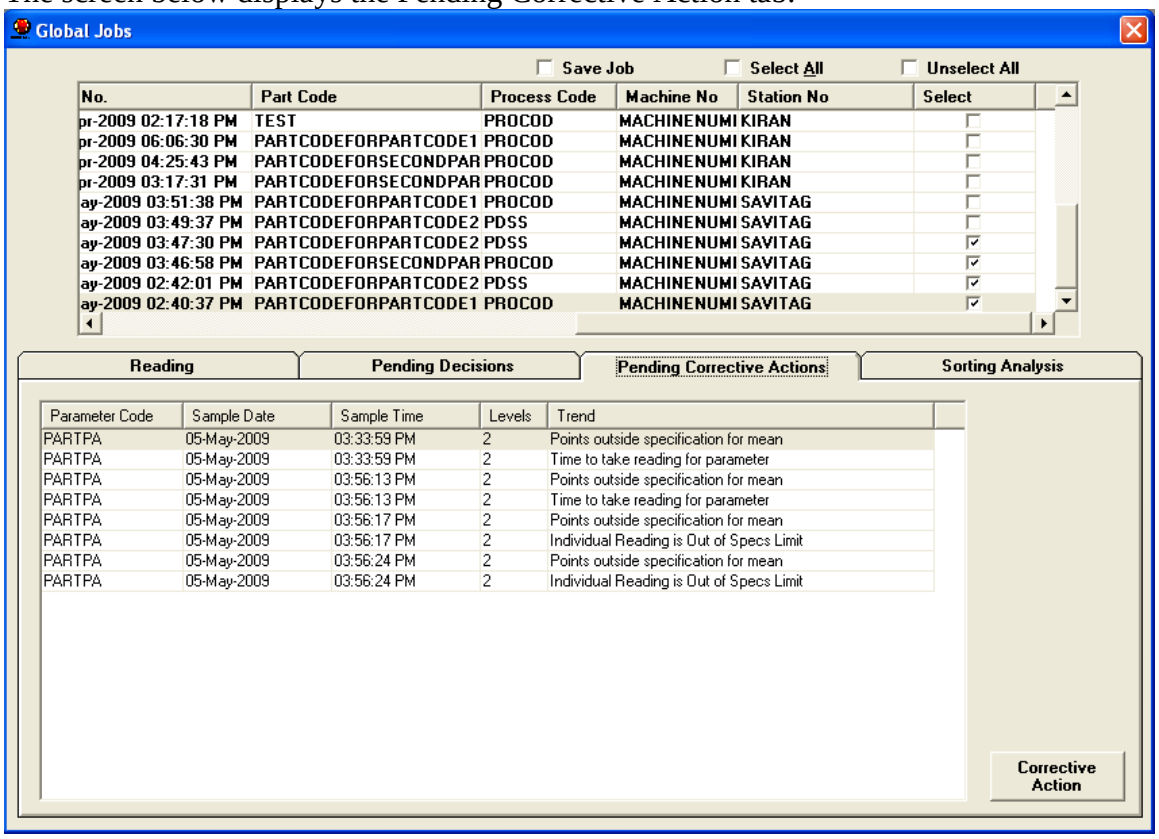
Details for the selected Job and Parameter such as **Station No**., **Process Code**, **Work Order No**, **Batch No.**, **Part No.**, **Machine No**., **Parameter Code** and **Parameter Typ**e will be display in the respective text boxes of Global Monitoring screen. Grid will be populated with all sample details for the selected job and part Parameter such as all readings taken, reading **Date**, reading **Time**, **Operator Code**, **LSL**, **USL**, **LCLx**, **UCLx**, **Mean** and **Reading Mode** for each sample. You can delete any sample by selecting it and clicking delete button. Confirmation message will be displayed 'Are you sure you want to delete this sample?' If you click no then sample will not be deleted. If you click yes and fixture is not associated with the selected job then the selected sample for only selected parameter will get deleted. If fixture is associated with the selected job any other parameters of the selected job have the sample number same as that of the selected one then only those samples for all those parameters will be deleted.
When component Number flag is assigned and user try to click on Delete button system will display message as 'Cannot Delete, Component number is assigned'.
Control limits will be calculated based on Repeated Calculation being checked in Work Order QAP for that parameter i.e. after every number of samples specified. If repeated recalculation is not selected then the control limits will be calculated only when the total no of samples taken equals the number of samples for limit calculation defined in the Work Order QAP.

Reading Change Facility –
Edit and Cancel button will get visible only for the user whose role is 'INST'
In the Grid if reading has gone out of Specs Limit then reading can be display in Red color. First user should select a row for which user want to change the reading & then click on Edit button, caption of the edit button change to Save & Cancel button will get enabled and reading column is available for editing. User can edit the reading and click on save button.

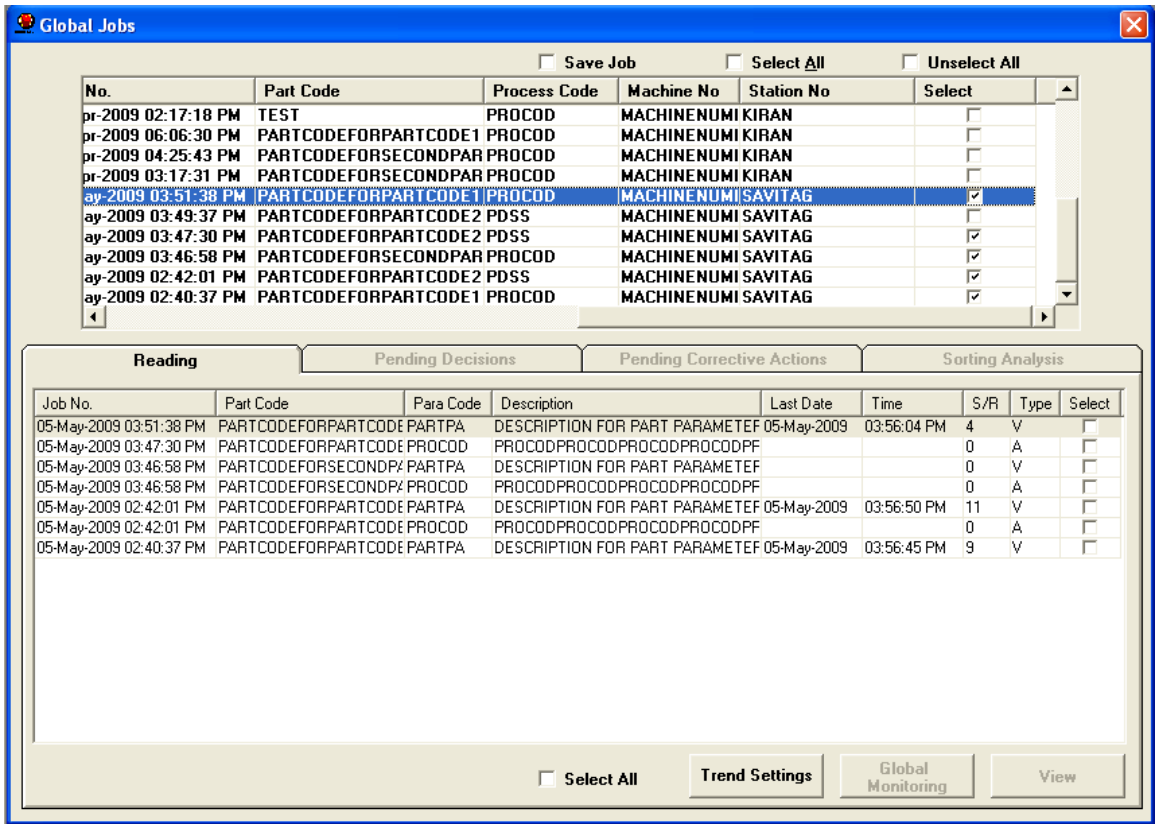
The *Global Jobs* screen displays the Parameter **Readings**, **Pending Decisions** and **Sorting Analysis** for decisions taken similar to *Local Monitoring* except for the measurement provision. The screen below displays the Pending Decisions tab.



The screen below displays the Pending Corrective Action tab.



The screen below displays the Sorting Analysis tab.



5.14.1 Auto Job Selection Facility

When the form is launched, it should display all the jobs for all the machines. Jobs will display in the descending order of Job No. for the stations. .
The user checks the select all check box, all the jobs in the job grid will be checked and the corresponding parameters will be displayed in the parameter grid. If all the jobs are selected in the job grid and select all button is clicked the selected jobs are unchecked and the corresponding jobs parameter are removed from the parameter grid.

If the select all checkbox is checked and all the jobs in the job grid are selected and the user clicks on unselect all check box the jobs get unselected and unselect all is disabled and select all is unchecked and enabled.
If the select all checkbox is checked and all the jobs in the job grid are selected and the user clicks Save Job, then next time when the Global Monitoring screen is launched the user will get all the previously selected jobs automatically.

Part COde,Process Code,Parameter Code, Machine No. and Job date fields are provided for the user selection. If user selects Part,Process and Parameter which is exist in Qap then software display the message 'Duplicate QAP' and populate the respective controls from the the existing QAP.

5.14.2 Job Closure

Select the job to be closed. You may select **Monitoring|Job Closure** from the Main Menu or click **Job Close** on the toolbar to close the job. System will ask 'Are you sure you want to close this job'. If user presses 'Yes' system will ask 'Do you want to create a job internally?' If user presses 'Yes' then system will create new job internally. Job Number will be Current date time and other details will be taken from the latest QAP for the selected Part and process of the closed jobs.
If the *Work Order Job Combine* is being used, on deletion of the last job of a work order, the Work Order gets deleted also.
You cannot close the selected job if:
Critical parameters exist for the selected job and no readings have been taken for them.
Some decisions are pending for the job.

5.15 Gauge Calibration

Use this option to record and maintain the Calibration details for an Instrument. The Calibrated Date, Next Calibration due date, whether it was calibrated In house or Outside, if outside then which company and the remarks, all these details will be maintained for the selected Instrument.
User can also enter wear value of an instrument for defined step code.Depending on the rights assigned to the user, the user can add the Calibrated details.

- Instrument Code - select required Instrument Code. The description of selected instrument will be displayed in the description text box.
- Calibrated Date - Calibrated date displayed will be the last calibrated date for the instrument. The user will modify calibrated Date by selecting from the calendar displayed after clicking on Calibrated Date date picker. The selected calibrated date can neither be less than the last calibrated date for the instrument nor it can be greater than the system date.

Next Calibration Date – It will be always greater than Calibrated date and System Date.

- Calibrated – Select one of the option button – In house or Outside

If Outside then the user will enter the Company Name in the Company Text box else if In house then the Company name will remain as In house itself.
The user may or may not enter any remarks in the Remarks text box. Click on Save.
The Calibration due date also updates the Instrument screen's calibration date field.
After selecting the instrument no, calibration frequency will display in frequency text box. After entering the calibration date, calibration due date will calculate based on calibration frequency & display in calibration due date Date Picker.In a grid user can enter wear value for step code.

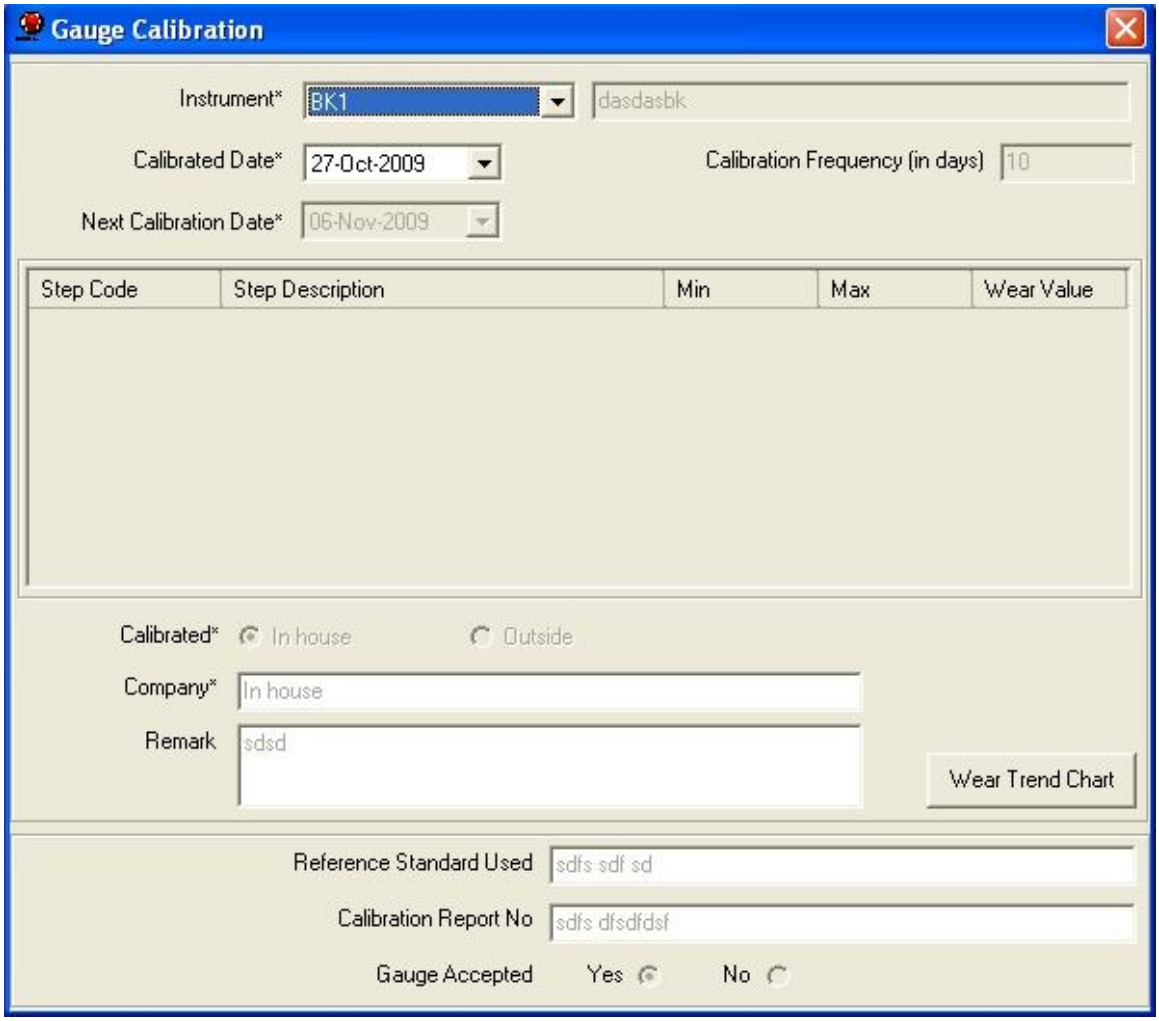
Modify Mode
The user is allowed to modify only the Calibrated details i.e. In house or Outside and the Remarks if any.User can select the instrument from the Instrument combo and the Calibrated date from Calibrated date combo. For the selected record the user can modify the Remarks and the Calibrated details.
During modify mode all calibration details for selected instrument will display and user can change wear value.

Save Mode
The user can save the record after Add or Modify Mode. If some invalid data has been entered in Add/Modify mode then at the time of saving the record, appropriate validation message will display and record will not be saved. On saving the record after Add mode, the added record is displayed. On saving the record after Modify mode, the modified record is displayed.
In Add/Modify mode, user will enter or change the wear value for all step code.

Cancel Mode –
The user can cancel the changes before saving the record, when in Add or Modify mode. On canceling the record when in Add mode, the first record will display. On canceling the record when in Modify mode, the record being modified will display.

View Mode –
In the View mode, Instrument code combo and Calibrated Date combo will be enabled state and all other controls including grid on the screen will be in disabled state. All the Calibrated dates for the instrument will be populated in the Calibrated Date combo. The User can select any instrument and any calibrated date for the instrument and view it's details.

When Gauge Management flag is true then only user can see the following fields.
Reference Standard used - Reference Standard used for Calibration.
Calibration Report No - Calibration Report of the Instrument.
Gauge Accepted - Calibration of Instrument is accepted Yes or No.


Gauge Calibration
Instrument*
BK1
dasdasbk
Calibrated Date*
27-Oct-2009
Calibration Frequency (in days)
10
Next Calibration Date*
06-Nov-2009
Step Code
Step Description
Min
Max
Wear Value
Calibrated*
In house
Outside
Company*
In house
Remark
sdsd
Wear Trend Chart
Reference Standard Used
sdfs sdf sd
Calibration Report No
sdfs dfsdfdsf
Gauge Accepted
Yes
No

6 Measurement Systems Analysis

MSA, which means Measurement System Analysis, is an important part of the Production Process. It is used to ascertain the correctness of the readings taken by the different instruments under different conditions.
If you don't conduct gauge studies, you don't know the capability of your gauges or the people who use them. Every measurement is suspect! You must know the uncertainty of your measurement system when making acceptance decisions and for Statistical Process Control.

Why do we need MSA?

We collect data for various reasons. In all cases, the data is analyzed and decisions are made. The effectiveness of the decisions depends upon the quality of the data. The existence of variation in data is inevitable, and all precautions must be taken to reduce it as much as possible. In a manufacturing process, as well as in a service process, the output is affected by various factors at various levels. Output is then measured according to some pre-established methods, a measurement system which has nothing to do with the process. This measurement process is used to generate numerical values of the subject of interest. Therefore, a measurement is defined as: "The assignment of numerical values to things to represent the relations among them with certain properties."
When data is collected, its values are affected by two independent processes. The first is the manufacturing or service process. The second is the measurement system process. The possibility of variation that can creep into the data from the measurement system can make the data unreliable for decision making purposes. Therefore, steps must be taken to reduce the variations in the measurement system as much as possible. Variation in a set of measurements is caused by people collecting the data, methods used to collect data, the data collection environment, measurement equipment used and the object of interest. The interaction between these components and their effect on the numerical values generated as data are to be evaluated to improve the measurement system. A major portion of the work of managing a measurement system is directed towards monitoring and controlling variation from that system.
If the magnitude of variation from the measurement system is not acceptable, then the system must be modified or replaced.
If we improve the manufacturing or service process without this knowledge, then we are tampering with the
process and wasting valuable resources.
A proactive approach to eliminate such waste can be accomplished through MSA.

Measurement system errors can be classified into five categories - bias, repeatability, reproducibility, stability and linearity.
One of the objectives of a measurement system study is to obtain information relative to the amount and types of measurement variation associated with a measurement system when it interacts with its environment. This information is valuable, since for the average production process, it is far more practical to recognize repeatability and calibration bias and establish reasonable limits for these, than to provide extremely accurate gauges with very high repeatability.

Applications of MSA

1. A criterion to accept new measuring equipment.
2. A comparison of one measuring device against another.
3. A basis for evaluating a gauge suspected of being deficient.
4. A comparison for measuring equipment before and after repair.
5. A required component for calculating process variation, and the acceptability level for a production process.
6. Estimating percentage variation in the process data due to measuring equipment.

MSA studies are of the following types:

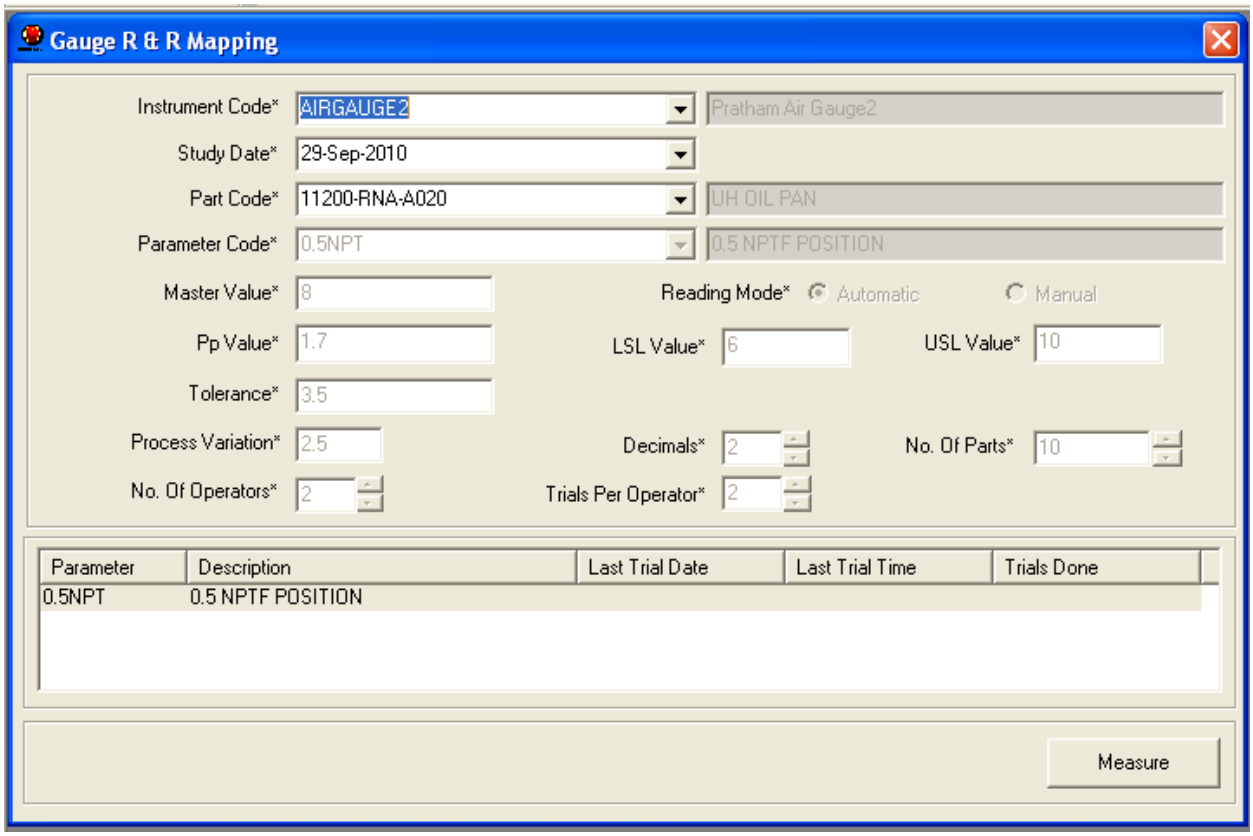
- Gauge Repeatability & Reproducibility Study
- Stability Study
- Bias Study
- Linearity Study

6.1 Gauge Repeatability & Reproducibility

Gauge R&R, which stands for Gauge Repeatability and Reproducibility, is a statistical tool that measures the amount of variation in the measurement system arising from the measurement device and the people taking the measurement.
"Gauge R&R is intended to be a study to measure the measurement error in measurement systems."
Repeatability:
Gauge Repeatability is the variation in the measurements obtained with one gauge when used several times by one operator while measuring the identical characteristic on the same part.
Two sources of repeatability error in the measurement system are:
1. Variation in measurements due to the gauge itself.
2. Positional variation of the part in the gauge.
Repeatability is thus also called the ***Equipment Variation (EV)***.
Reproducibility:
Gauge Reproducibility is the variation in the average of measurements made by different operators using the same gauge when measuring identical characteristic on the same part. Reproducibility error catches the variation due to operators. It is also called the ***Appraiser Variation (AV)***.
Study to find *Gauge Repeatability & Reproducibility* is divided into three parts - *GRR Mapping, GRR Measurement* and *GRR Data Analysis.*

6.1.1 GRR Mapping

Select **Gauge R & R Study**|**Mapping** from the Measurement Systems Analysis menu to display the *Gauge R & R Mapping* screen. Use this option to map an instrument to a part and its corresponding parameters for taking measurements for the Gauge R & R study. You can also view the number of trials done for a parameter along with the date and time of the last trial. Once all trials for all parameters have been completed then that study is not displayed on this screen.
The local machine no. (i.e. Station No.) shall be considered by default for mapping details for an instrument.

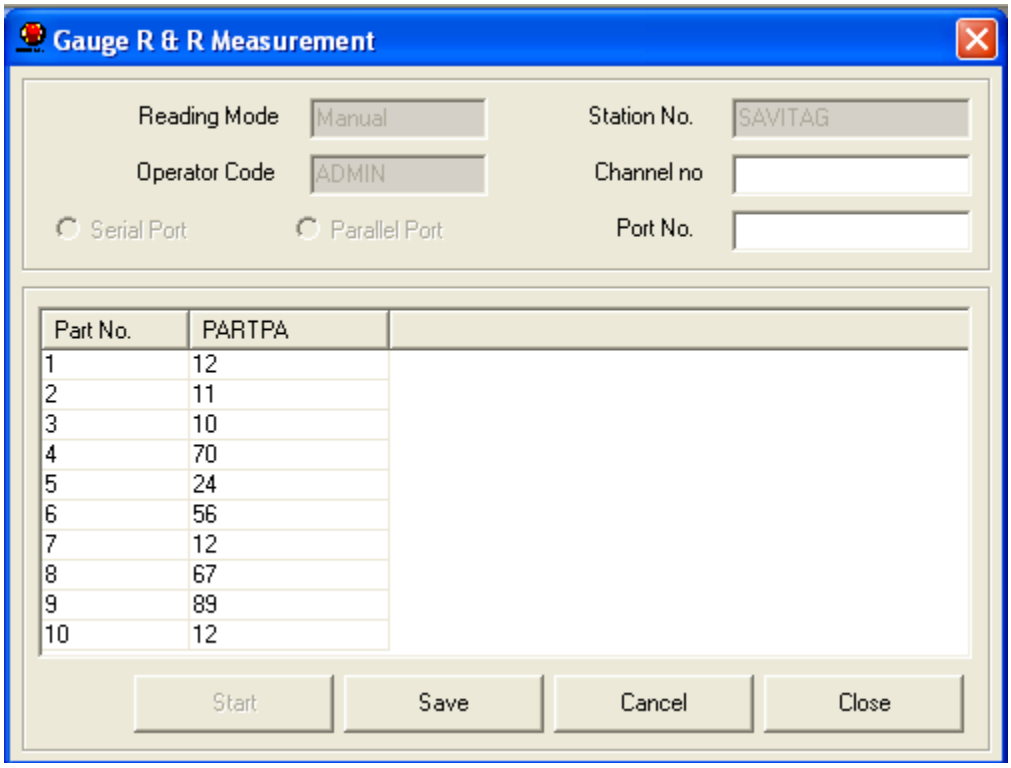


Click **Add** to add a new record. Select **Instrument Code** from the drop down list displayed from the *Instrument* master. **Study Date** displays the current date. Select appropriate date not less than the current date, if required. Select **Part Code** from the drop down list displayed from the *Part* master. Select **Parameter Code** from the drop down list. This list contains only those parameters which have not been mapped to the selected instrument code, study date, part code and local machine.
Enter the **Master Value.** Specify the **Reading Mode –** whether *Automatic* or *Manual.*
Enter **Pp Value, LSL Value, USL Value, Tolerance, and Process Variation.** At least one of these [Tolerance, and Process Variation] two fields must be entered.
Select **Decimals, No. Of Parts, No. Of Operators** and **Trials Per Operator** by clicking the up or down arrows attached to the fields. Their default values are 0, 10, 2, and 2 respectively.
Click **Save** to save the record. You can map only as many parameters as are specified for the interface code of the instrument.
Once a parameter has been mapped for an instrument, **No. Of Parts, No. Of Operators** and **Trials Per Operator** are set for all subsequent parameters. Use Pp Value, LSL Value and USL Value to calculate GRR value using Pp method.
Click **Modify** to make changes. You can modify **Decimals, Reading Mode, Master Value, No. Of Parts, No. Of Operators, Trials per Operator, Tolerance, Process Variation** and **Study Date** only if trials have not begun for the selected Instrument Code, Part code and Parameter code. If some trials have been taken for the mapped part and parameter then you can modify only **Decimals** and **Reading Mode.** If you change **No. Of**

Parts, No. Of Operators or **Trials Per Operator** for a parameter, the same change is made for all other parameters mapped to that instrument code.
Click **Measure** if you wish to go to the *Gauge R & R Measurement* screen to record readings.
Click **Delete** to delete a record. You can delete a record for a Local Machine only if trials have not begun for it. For deleting a record, you must specify the Instrument Code, Study Date, Part Code and its corresponding Parameter by selecting them from the respective drop down lists.

6.1.2 GRR Measurement

The *Gauge R & R Measurement* screen is displayed below.



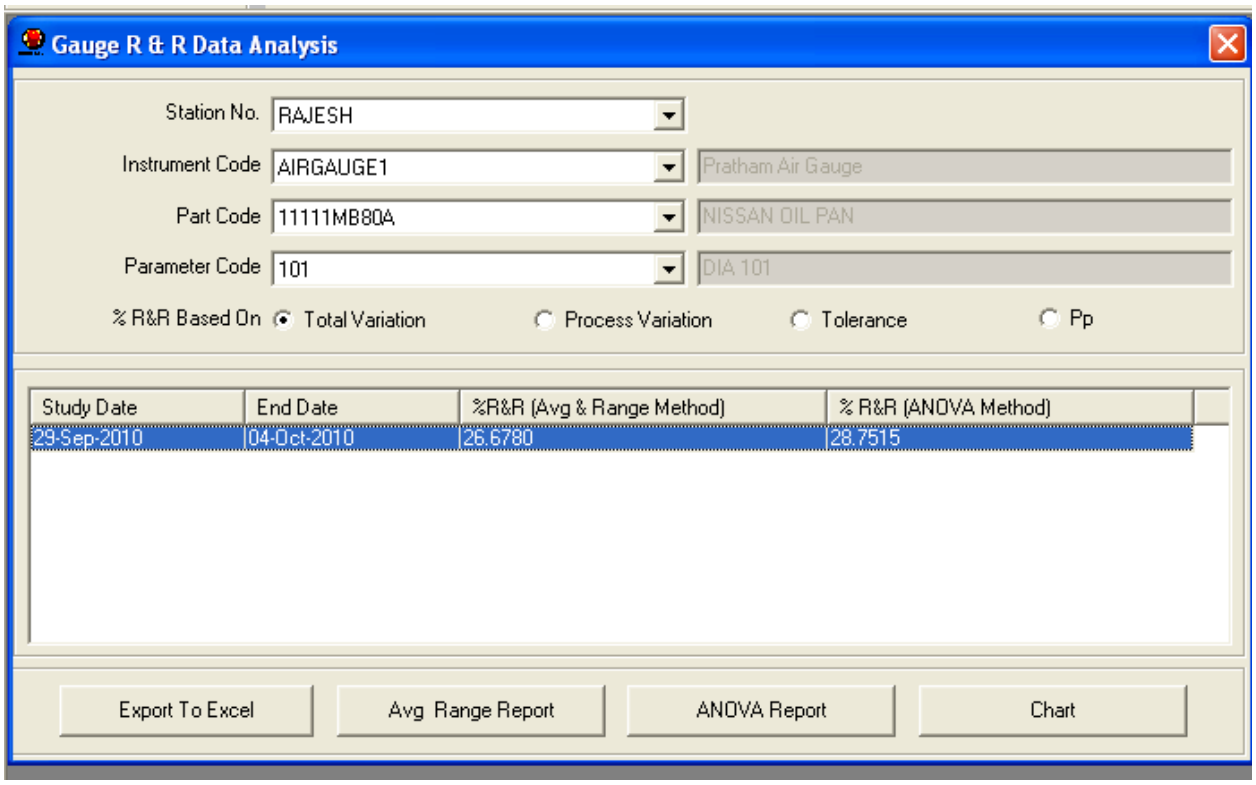
This screen gives you a facility to capture the readings for an Instrument both Manually and Automatically. You can take simultaneous readings for all the parameters mapped to an instrument. Details of the Channel No., Serial/Parallel Port, and Port No. for the Instrument are also provided.
Reading Mode and **Station No.** are displayed from the *Stability Mapping* screen. The current user is displayed as the **Operator Code.**
For *Manual* Reading Mode, the Operator Code is used to identify by whom the readings were taken. **Channel No.** and Port Details (whether **Serial Port** or **Parallel Port, Port No.)** are not defined.
For *Automatic* Reading Mode, whether **Serial Port** or **Parallel Port** is displayed from the *Interface* master of the Instrument. **Port No.** and **Channel No.** are displayed from the *Instrument* master.

A grid is provided for taking readings. The first column displays Part numbers from 1 to '*n'*, where '*n*' is the number of parts specified in the *Gauge R & R Mapping* screen. The balance column/s of the grid are for readings. The number of columns for readings is equal to the number of parameters mapped to the instrument. The readings columns display the parameter names as the headings. e.g. If for the Dumore instrument, 3 parameters ID1, ID2, ID3 are mapped in the *Gauge R & R Mapping* screen, then the *Gauge R & R Measurement* screen is launched with the provision of three column for the reading values. The reading value column headers have names as ID1, ID2, and ID3 respectively.
Click **Modify** to make changes. You can modify Channel No., whether Serial Port or Parallel Port and Port No. only if the reading mode is *Automatic.*

Taking Measurements
At a given time, only as many operators may log on as are specified in the *Gauge R & R Mapping* screen. An operator may take only as many trials as are specified in the *Gauge R & R Mapping* screen.
In *Manual* mode, you can enter readings directly into the grid for a particular part and parameter. You can modify readings only until they are saved.
In *Automatic* mode, select the Part No. for which you wish to take the reading by clicking on the corresponding row. Click **Start.** A question is displayed whether to proceed with readings. On confirmation, the reading is displayed on the respective parameter cell corresponding to the selected Part No. when you press the switch on the instrument. Repeat the same steps for the other parts. Readings displayed in this way cannot be modified.
Click **Save** to save readings after all readings for all parts and parameters have been taken. You cannot save only a part of the readings. A reading cannot be modified once it is saved.
Click **Close** to return to *Gauge R & R Mapping* screen. The **Last Trial Date**, **Last Trial Time** and **Trials Done** are updated for the parameter(s) for which the trial was taken.

6.1.3 Gauge R & R Data Analysis

Select **Gauge R & R Study**|**Data Analysis** from the Measurement Systems Analysis menu to display the *Gauge R & R Data Analysis* screen. Use this option to analyze the results of the study carried out for the gauge i.e. Instrument. You can also view Percentage R&R result using the Average And Range method and ANOVA method.



Completed studies from all the stations are displayed in this screen. Completed studies are those studies for which all trials have been completed using the **Gauge R&R Mapping** option. If no Gauge R&R study has been closed from any station then the message 'No studies have been closed' is displayed.

Select **Station No.** from the drop down list which displays all stations from which Gauge R & R study has been carried out and completed. Select **Instrument Code** from the drop down list, which displays the instruments for the selected Station No. for which studies have been closed. Select **Part Code** from the drop down list which displays the related parts for the selected Station No. and Instrument Code. Select **Parameter** Code from the drop down list which displays the related parameters for the selected Station No., Instrument Code and Part Code.

The Process Variation or Tolerance value options are visible on the screen only if a value has been entered for these respectively for the selected study while mapping.

If only Tolerance value has been entered for the selected study then on the Data Analysis screen the Total Variation and Tolerance options are visible. If Process Variation has been entered then Total Variation and Process Variation options are visible.

If both the values are entered for the study then all the three options are visible on the screen.

Select the required option from **Total Variation, Process Variation**, **Tolerance or Pp method**. Total Variation is selected by default. You may select Process Variation or Tolerance only if values have been specified in the related fields for the selected record in the *Gauge R & R Mapping* screen.

Study Date, **End Date** (i.e. the date when the last trial was taken), calculated values of **% R & R (Average and Range Method)** and **% R & R (ANOVA Method)** for the

Station No, Instrument Code, Part Code and Parameter Code are displayed in the grid based on selection of Total Variation, Process Variation or Tolerance options.
Click **Avg & Range Report** to view the Gauge R & R Report (Average And Range Method).
Click **ANOVA Report** to view the Gauge R & R Report (ANOVA Method).
Click **Chart** to view the Chart for Gauge R & R.
Calculate %R&R for average and Range Method and ANOVA method using Pp method.
To use the Pp option, use the following TV in the GRR analysis **[ANOVA and Average & Range Report].**
Pp = USL-LSL/6 $Sigma_p$ = USL – LSL / 6s = USL-LSL/6TV
Then TV = USL – LSL / 6 Pp
And PV = Square root ($TV^2 – GRR^2$)
When using the Pp approach to TV, the calculation for ndc is

$TV^2 = PV^2 + GRR^2$
Or $PV^2 = TV^2 - GRR^2$
Then
ndc = 1.41(PV/GRR) = 1.41 Square root ($T V^2 – GRR^2$) / GRR

6.1.3.1 Gauge R & R Report (Average And Range Method)

The **Average & Range method** (XBar & R) is a mathematical method which will provide an estimate of both repeatability and reproducibility for a measurement system. Average and range method allows the measurement systems to be decomposed into two separate components, repeatability and reproducibility, but not their interaction.
The ANOVA method can be used to determine this interaction between the gauge and the appraisers.
However both the **Average and Range method** and ANOVA method will provide information concerning the causes of measurement system or gauge error.
This report displays the results of Gauge R&R Study using the **Average and Range method**. All readings and calculated results are displayed. The results are shown in terms of the Repeatability percentage, Reproducibility percentage, percentage of Part Variation, percentage R&R and Total Variation percentage.
Repeatability percentage is the Equipment Variation percentage.
Reproducibility percentage is the Appraiser (Operator) Variation percentage.
The calculations of percentage contribution of variations are based on Total Variation, Process Variation or Tolerance value.
To generate the report, select related fields from the *Gauge R & R Data Analysis* screen and click **Avg & Range Report.**

6.1.3.2 Gauge R & R Report (ANOVA Method)

Analysis of Variance (ANOVA) is a statistical technique for analyzing data that tests for a difference between two or more means by comparing the variances “within” groups and variances “between” groups.
The Average & Range method (XBar & R) is a mathematical method which will provide an estimate of both repeatability and reproducibility for a measurement system. Average

and range method allows the measurement systems to be decomposed into two separate components, repeatability and reproducibility, but not their interaction.
The **ANOVA method** can be used to determine this interaction between the gauge and the appraisers.
However both the Average and Range method and **ANOVA method** will provide information concerning the causes of measurement system or gauge error.
This report displays the results of Gauge R&R Study using the **ANOVA method**. All readings and calculated results are displayed. The results are shown in terms of the Repeatability percentage, Reproducibility percentage, percentage of Part Variation, percentage Interaction, percentage R&R and Total Variation percentage.
Repeatability percentage is the Equipment Variation percentage.
Reproducibility percentage is the Appraiser (Operator) Variation percentage.
Percentage Interaction is the interaction of part and appraiser percentage.
The calculations of percentage contribution of variations are based on Total Variation, Process Variation or Tolerance value.
To generate the report, select related fields from the *Gauge R & R Data Analysis* screen and click **ANOVA Report.**

6.1.3.3 Chart

Select related fields on the *Gauge R & R Data Analysis* screen and click **Chart** to display the **Error Chart** and **X Bar R Chart.**
The **Gauge R & R X Bar R Chart** plots the average and range of data collected for each part number by each operator.

6.1.3.3.1 Error Chart

The **Error Chart** is a tool for Error Analysis. The chart is drawn on the basis of reference values defined during mapping of instruments to parts and parameters for Gauge R & R study.
An Error Chart takes measurement data and displays its individual deviations from the accepted reference. It reveals the amount of variation that any parameter of a part has from its reference value. The horizontal axis of the Error Chart represents the error value for different operators for different trials of a part. The vertical axis of the Error Chart represents the range of errors for measurements of the part – parameter.

6.2 Stability

Stability is the total variation in the measurements obtained with a measurement system on the same master or parts when measuring a single characteristic over an extended time period.

1) Obtain a sample and establish its reference value(s). If one is not available, select a production part that falls in the mid-range of the production measurements and designate it as the master sample for stability analysis. The known reference value is not required for tracking measurement system stability.
2) On a periodic basis (hourly, daily, weekly), measure the master sample three to five times. The sample size and frequency should be based on knowledge of the

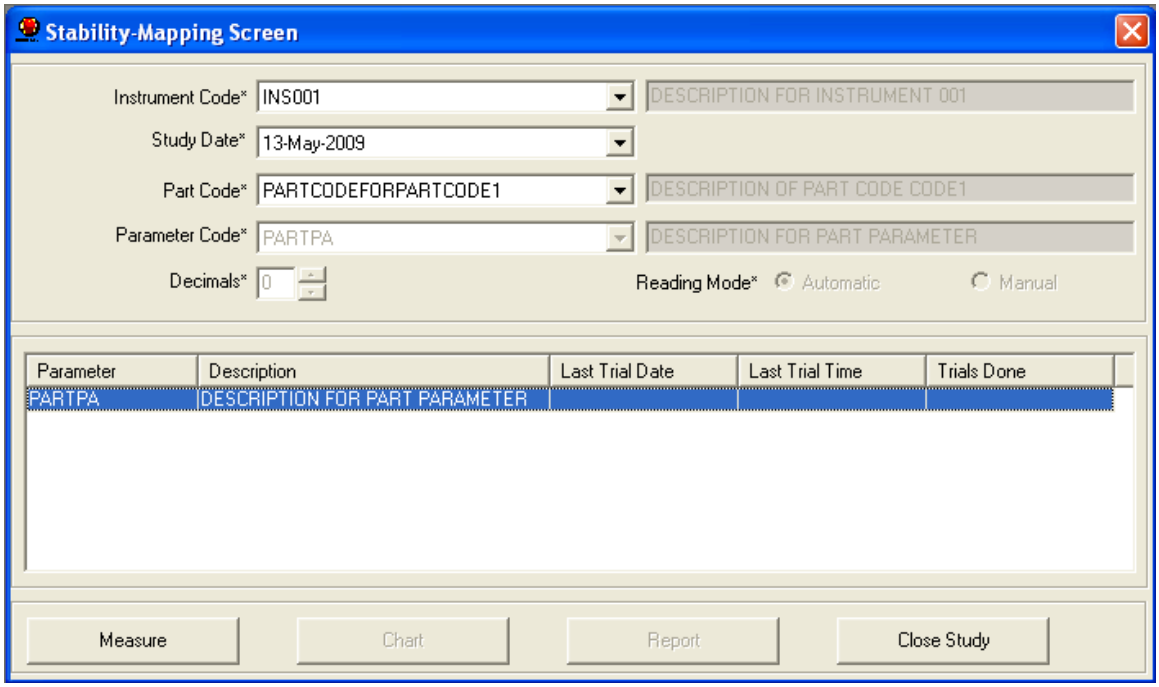
measurement system. Factors could include how often recalibration or repair has been required, how frequently the measurement system is used, and how stressful the operating conditions are. The readings should be taken at different times to represent when the measurement system is actually being used. This is account for warm-up, ambient or other factors that may change during the day.

3) Plot the data on an XBar R or XMR control chart.
4) Establish control limits and evaluate for out of control or unstable conditions.
5) Compute the standard deviation for the measurements and compare it with that of the process to determine if the measurement system reliability is suitable for the application.

Study to find the *Stability* of the measurement system is divided into three parts – *Stability Mapping, Stability Measurement* and *Stability Data Analysis.*

6.2.1 Stability Mapping

Select **Stability Study**|**Mapping** from the Measurement Systems Analysis menu to display the *Stability-Mapping Screen*. Use this option to study the stability of an instrument over a period of time. This is done by mapping the instrument to a part and its corresponding parameters through different reading modes on a study date. You may view the variance in the stability of the instrument in the form of a chart or a report.
You can see details of the Instrument, Part and Parameter on which the readings will be taken. Reading mode, number of decimal places required for the readings, number of readings taken, date of study and last reading date and time for the instrument are also displayed.
The local machine will display all studies mapped on that machine. Once the study is closed by clicking **Close Study**, then that study is not displayed on the screen.

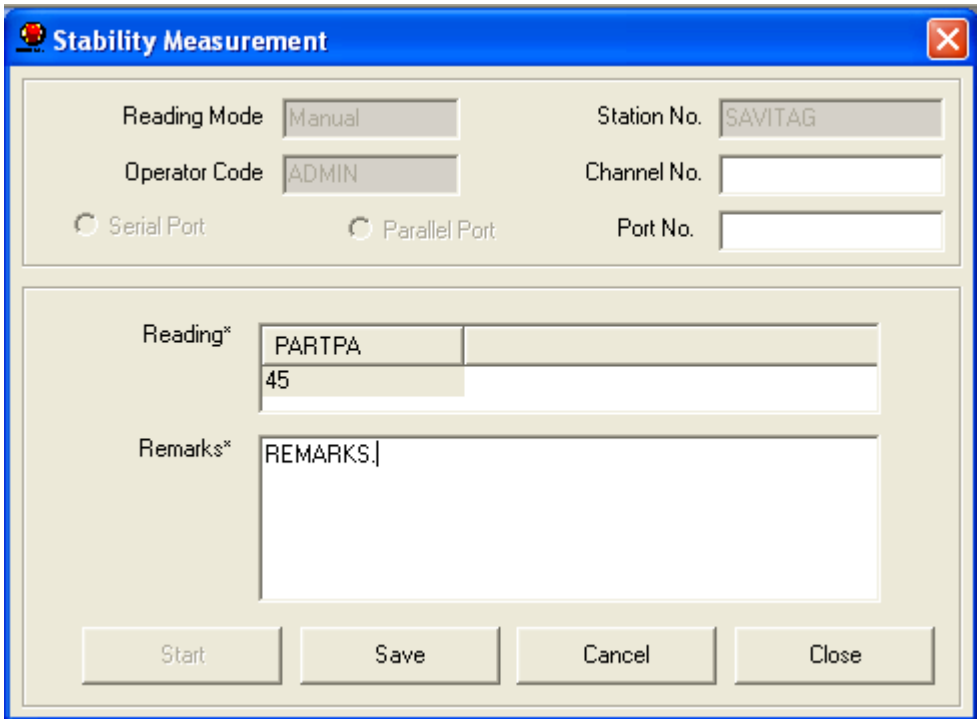


Click **Add** to add a new record. Select **Instrument Code** from the drop down list displayed from the *Instrument* master. **Study Date** displays the current date. Select a date not less than the current date, if required. Select **Part Code** from the drop down list displayed from the *Part* master. Select **Parameter Code** from the drop down list. This list contains only those parameters which have not been mapped to the selected instrument code, study date, part code and local machine.
Select **Decimals** by clicking the up or down arrows attached to the field. The default value is 0. Specify the **Reading Mode –** whether *Automatic* or *Manual.* It is set to *Automatic* by default.
Click **Save** to save the record. You can map only as many parameters as are specified for the interface code of the instrument.
Once a parameter has been mapped for an instrument, the same **Reading Mode** is set for all subsequent parameters.
Click **Modify** to make changes. You can modify **Decimals** and **Reading Mode.** If you change **Reading Mode** for a parameter, the same change is made for all other parameters mapped to that instrument code on that study date.
Click **Measure** if you wish to go to the *Stability Measurement* screen to record readings. You must map the total number of parameters which are specified for the interface code of the instrument before you can click **Measure**. Otherwise a message will be displayed and the screen will not be launched.

You can view **Reports and Charts** if one or more sets of readings have been entered for a study.
Click **Report** to view a report displaying details of the stability of the instrument over a period of time.
Click **Chart** to view a graphical image of the details of the stability of the instrument over a period of time. The Chart Selection screen is displayed. Select *XbarR* or *XMR* chart.
Click **Close Study** to close the stability study for an instrument. The data related to this study is then transferred to the *Stability Data Analysis* screen.
Click **Delete** to delete a record. You can delete a record for a Local Machine only if trials have not begun for it. For deleting a record, you must specify the Instrument Code, Study Date, Part Code and its corresponding Parameter by selecting them from the respective drop down lists.

6.2.2 Stability Measurement

The *Stability Measurement* screen is displayed below.



This screen gives you a facility to capture the readings for an Instrument both Manually and Automatically. You can take simultaneous readings for all the parameters mapped to an instrument. Details of the Channel No., Serial/Parallel Port, and Port No. for the Instrument are also provided.
Reading Mode and **Station No.** are displayed from the *Stability Mapping* screen. The current user is displayed as the **Operator Code.**

For *Manual* Reading Mode, the Operator Code is used to identify by whom the readings were taken. **Channel No.** and Port Details (whether **Serial Port** or **Parallel Port, Port No.)** are not defined.
For *Automatic* Reading Mode, Port settings will be displayed based on the selected and connected instrument. If the instrument is connected to a serial port, then the Serial Port value is displayed as **Port No.** If the instrument is connected to a parallel port, then the parallel port number and the channel to which instrument is connected will be displayed as **Port No.** and **Channel No.** respectively.

A grid is provided for taking readings. The number of columns for readings will be equal to the number of parameters mapped to the instrument. The readings columns display the parameter names as the headings. e.g. If for the Dumore instrument, 3 parameters ID1, ID2, ID3 are mapped in the *Stability Mapping* screen, then the *Stability Measurement* screen is launched with the provision of three column for the reading values. The reading value column headers have names as ID1, ID2, and ID3 respectively.
There will be only one row for the grid since at one trial only one reading can be taken for the mapped parameters.
Enter multiple lines of remarks on the reading taken in the **Remarks** textbox. The **Start** button is enabled only when the reading mode is Automatic.

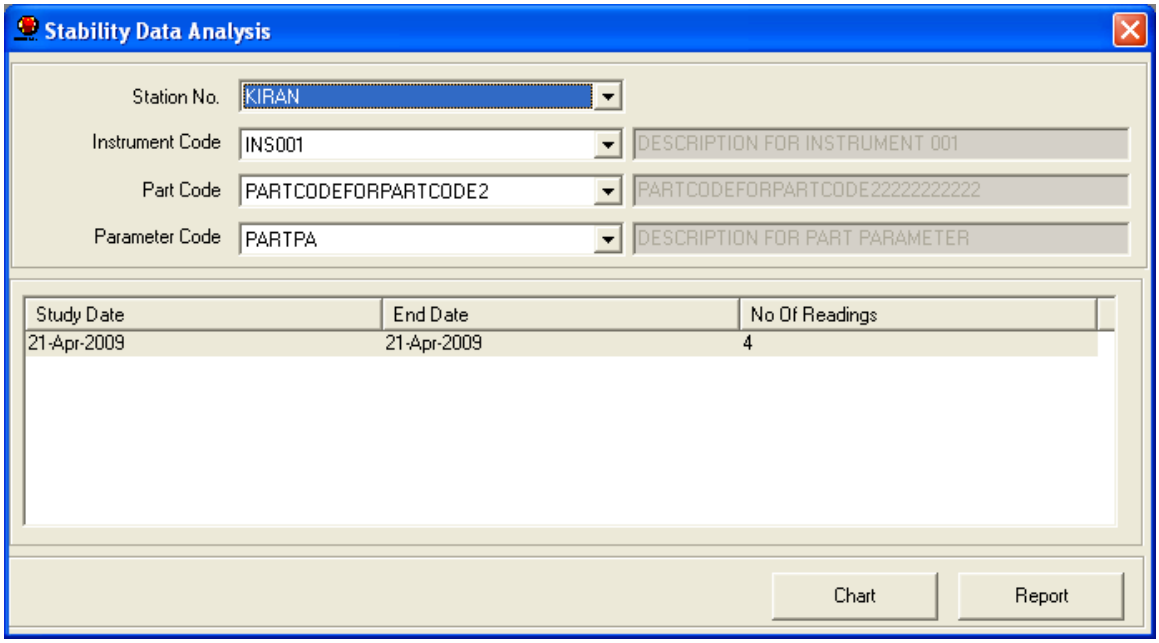
Click **Modify** to make changes. You can modify **Channel No.** and **Port No.** only if the reading mode is *Automatic*. If the Interface for the instrument selected in the study has serial port settings, then you can modify only **Port No.** If the interface for the instrument selected has parallel port settings, then you can modify only **Channel No.**

Taking Measurements
In *Manual* mode, you can enter readings directly into the grid for the parameters in the respective columns. You can modify readings only until they are saved.
In *Automatic* mode, select the row in the grid. Click **Start.** The readings are displayed in the respective parameter cells when you press the switch on the instrument. They are displayed with appropriate decimals places that are set to each parameter while mapping. Readings displayed in this way cannot be modified.
After the readings are entered or displayed, you can enter **Remarks** about the readings taken.

Click **Cancel** to cancel all the readings and remarks displayed and you can take readings afresh.
Click **Save** to save readings after all readings for all parameters have been taken. You cannot save only a part of the readings. A reading cannot be modified once it is saved.
Click **Close** to return to *Stability Mapping* screen. The **Last Trial Date**, **Last Trial Time** and **Trials Done** are updated for the parameter(s) for which the trial was taken.

6.2.3 Stability Data Analysis

Select **Stability Study|Data Analysis** from the Measurement Systems Analysis menu to display the *Stability Data Analysis* screen. Use this option to analyze the results of the Stability study carried out for the Instrument. You can analyze the results using Charts and Reports. You can only view the data in this screen without making any changes.



Completed studies from all the stations are displayed in this screen. Completed studies are those studies which have been closed using the **Stability Mapping** option. If no Stability study has been closed from any station then the message 'No studies have been closed' is displayed.
Select **Station No.** from the drop down list which displays all stations from which the Stability study has been carried out and completed. Select **Instrument Code** from the drop down list which displays the instruments for the selected Station No. for which studies have been closed. Select **Part Code** from the drop down list which displays the related parts for the selected Station No. and Instrument Code. Select **Parameter** Code from the drop down list which displays the related parameters for the selected Station No., Instrument Code and Part Code.
Study Date, **End Date** (i.e. the date when the last trial was taken) and **No. Of Readings** for the Station No, Instrument Code, Part Code and Parameter Code are displayed in the grid.

6.2.3.1 Stabilility Charts

Click **Chart** to view a graphical image of the details of the stability of the instrument over a period of time. The Chart Selection screen is displayed. Select *XbarR* or *XMR* chart.
The **XbarR** chart plots the average and range of data collected for each sample.
The **XMR** chart plots the reading and moving range of data collected for each reading.

6.2.3.2 Stability Report

Click **Report** to view a report displaying details of the stability of the instrument over a period of time.
This report can be generated in the following ways:
1. In the *Stability Mapping Screen*, enter or select Instrument Code, Study Date, Part Code and Parameter Code from the respective drop down lists and click **Report.** The report will be generated only after readings have been taken.
2. In the *Stability Data Analysis* screen, select Station No., Instrument Code, Part Code and Parameter Code from the respective drop down lists. Select the required Study Date and End Date from those displayed in the grid and click **Report.**

The report contains:
- All readings entered through the *Stability Measurement* screen.
- Details of the Instrument, Part, Parameter, Station on which the readings have been taken.
- The Reading Mode, Study Date and End Date for the readings.
- The Reading Serial No., Date, Time and Remarks.

6.3 Bias

Bias is the difference between the observed average of measurements and the reference value or true value of the part.

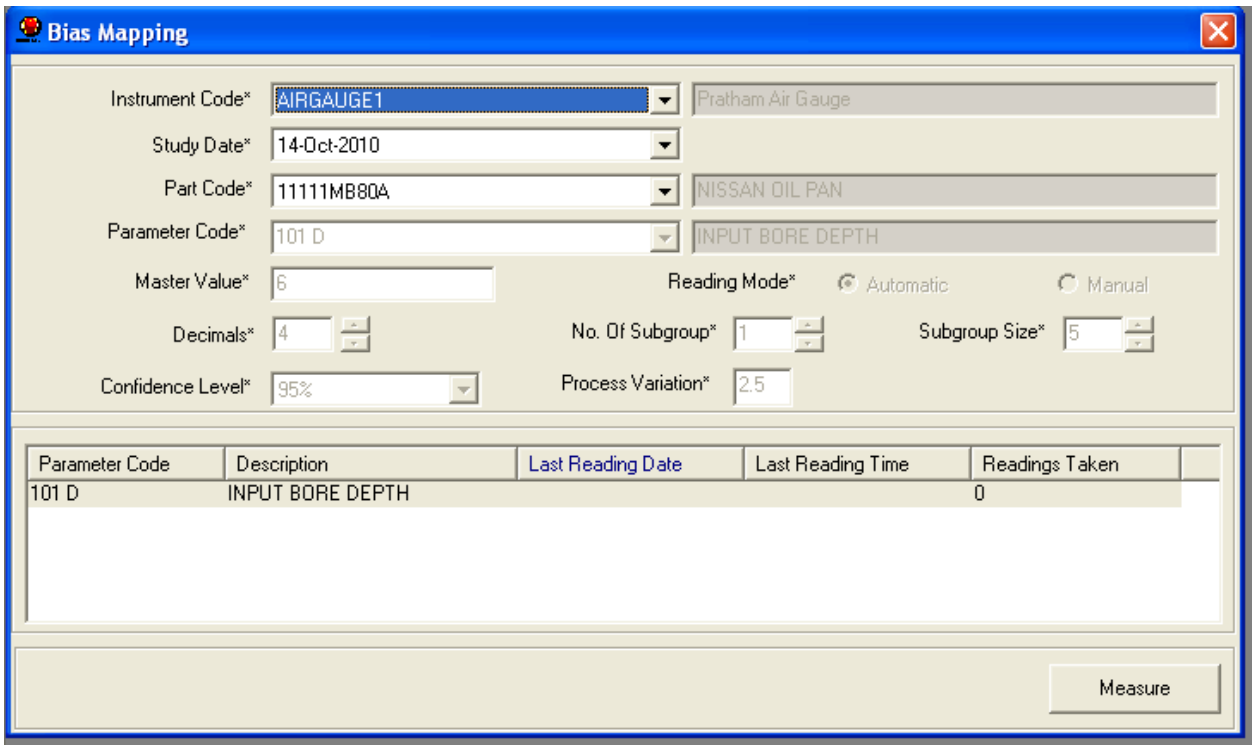
To determine the measurement system's BIAS at a specific location in the process range, it is necessary to obtain accurate reference value of a part. This can usually be done with tool room or layout inspection equipment.

1) Measure one of the sample parts precisely on tool room or layout inspection equipment
2) Have one appraiser measure the same part a minimum of 5 times, using the gauge being evaluated.
3) Calculate the average of the readings. The difference between the reference value and the observed average represents the measurement system's bias

If an index is desired, convert bias to a percentage of process variation (or tolerance), by multiplying 100 and dividing by the process variation (or tolerance).
Study to find *Bias* is divided into three parts - *Bias Mapping*, *Bias Measurement* and *Bias Data Analysis.*

6.3.1 Bias Mapping

Select **Bias Study**|**Mapping** from the Measurement Systems Analysis menu to display the *Bias Mapping* screen. Use this option to map parts and parameters to the instrument for which Bias study is to be carried out.
Once all readings for all parameters have been completed then that study is not displayed on this screen. The local machine will display all studies mapped on that machine.

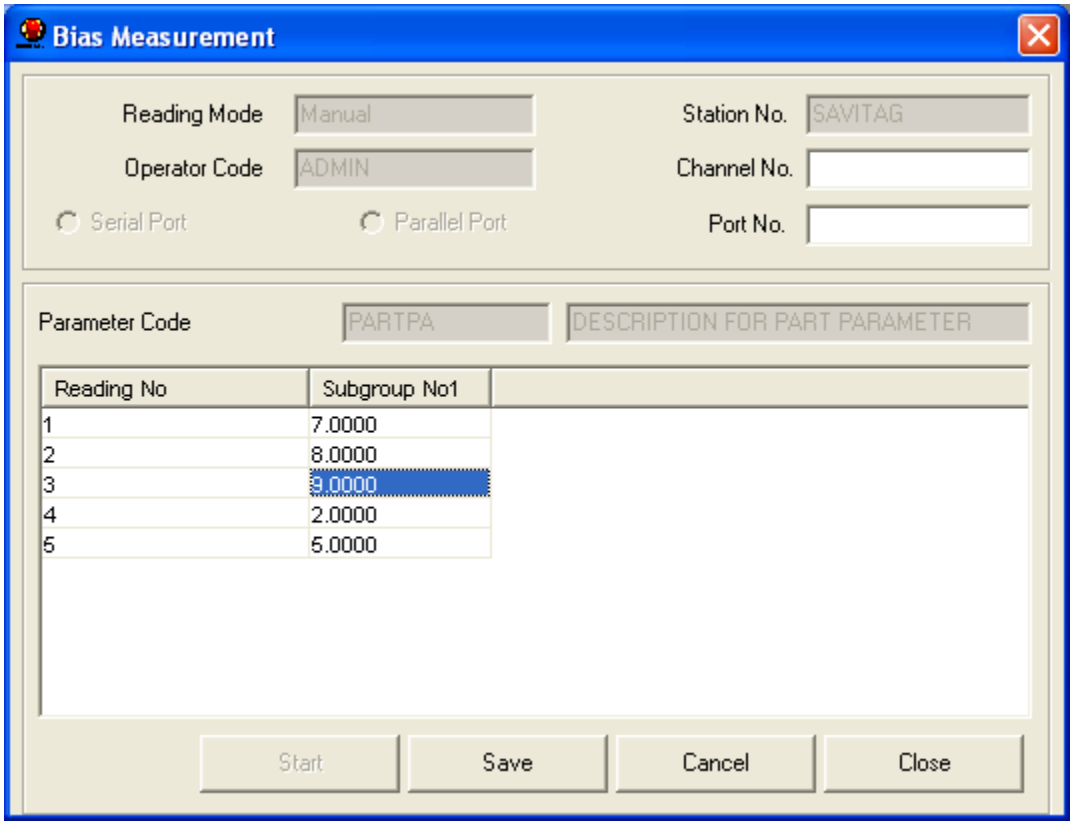


Click **Add** to add a new record. Select **Instrument Code** from the drop down list displayed from the *Instrument* master. **Study Date** displays the current date. Select a date not less than the current date, if required. Select **Part Code** from the drop down list displayed from the *Part* master. Select **Parameter Code** from the drop down list. This

list contains only those parameters which have not been mapped to the selected instrument code, study date, part code and local machine.
Enter the **Master Value.** Specify the **Reading Mode –** whether *Automatic* or *Manual*.
Enter **Tolerance** and **Process Variation.** At least one of these two fields must be entered.
Select **Decimals** and **No. Of Readings** by clicking the up or down arrow attached to the fields. The default value for **Decimals** is 0 and **No. Of Readings** has a value between 5 and 30.
Process variation is added to calculate %EV i.e. to determine the repeatability is acceptable.
Click **Save** to save the record. You can map only as many parameters as are specified for the interface code of the instrument.
Once a parameter has been mapped for an instrument, **Reading Mode** and **No. Of Readings** are set for all subsequent parameters.
Click **Modify** to make changes. You can modify **Decimals, Reading Mode, Master Value, No. Of Readings, Tolerance** and **Process Variation** only if readings have not begun for the selected Instrument Code, Part code and Parameter code. If some readings have been taken for the mapped part and parameter then you can modify only **Decimals** and **Reading Mode.** If you change **Reading Mode** or **No. Of Readings** for a parameter, the same change is made for all other parameters mapped to that instrument code.
Click **Measure** if you wish to go to the *Bias Measurement* screen to record readings. You must map the total number of parameters which are specified for the interface code of the instrument before you can click **Measure**.
After taking all readings which are specified in the **No. Of Readings** field for all parameters of the selected Study Date, Instrument Code and Part Code, that particular study will get closed. The data related to this study is then transferred to the *Bias Data Analysis* screen.
Click **Delete** to delete a record. You can delete a record for a Local Machine only if readings have not begun for it. For deleting a record, you must specify the Instrument Code, Study Date, Part Code and its corresponding Parameter by selecting them from the respective drop down lists.

6.3.2 Bias Measurement

The *Bias Measurement* screen is displayed below.



This screen gives you a facility to capture the readings for an Instrument both Manually and Automatically and to calculate the Bias value. You can take simultaneous readings for all the parameters mapped to an instrument. Details of the Channel No., Serial/Parallel Port, and Port No. for the Instrument are also provided.
Reading Mode and **Station No.** are displayed from the *Bias Mapping* screen. The current user is displayed as the **Operator Code.**
For *Manual* Reading Mode, the Operator Code is used to identify by whom the readings were taken. **Channel No.** and Port Details (whether **Serial Port** or **Parallel Port, Port No.)** are not defined.
For *Automatic* Reading Mode, Port settings will be displayed based on the selected and connected instrument. If the instrument is connected to a serial port, then the Serial Port value is displayed as **Port No.** If the instrument is connected to a parallel port, then the parallel port number and the channel to which instrument is connected will be displayed as **Port No.** and **Channel No.** respectively.

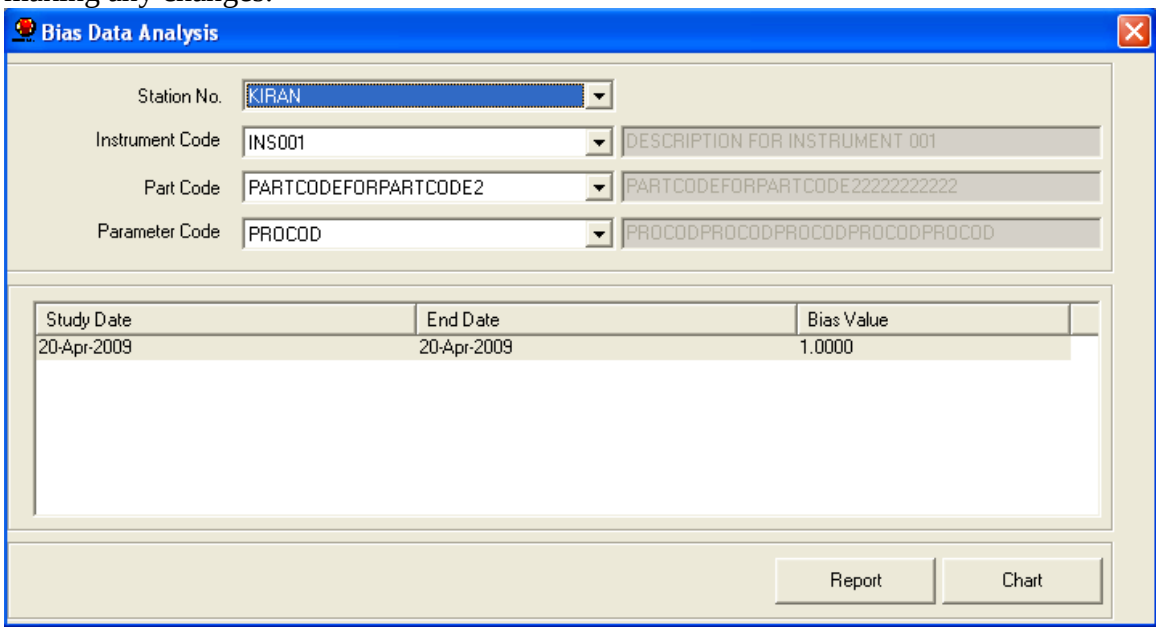
A grid is provided for taking readings. The first column displays Reading numbers from 1 to '*n'*, where '*n*' is the number of readings specified in the *Bias Mapping* screen. The balance columns of the grid are for readings. The number of columns for readings is equal to the number of parameters mapped to the instrument. The readings columns display the parameter names as the headings. e.g. If for the Dumore instrument, 3 parameters ID1, ID2, ID3 are mapped in the *Bias Mapping* screen, then the *Bias Measurement* screen is launched with the provision of three column for the reading values. The reading value column headers have names as ID1, ID2, and ID3 respectively. The **Start** button is enabled only when the reading mode is Automatic.

Click **Modify** to make changes. You can modify **Channel No.** and **Port No.** only if the reading mode is *Automatic*. If the instrument selected is connected to a serial port, then you can modify only **Port No.** If the instrument selected in the study is connected to a parallel port, then you can modify only **Channel No.**

Taking Measurements
You can select the **Reading No.** randomly to take readings.
In *Manual* mode, you can enter readings directly into the grid for the parameters in the respective columns. You can modify readings only until they are saved.
In *Automatic* mode, select the row in the grid. Click **Start.** The readings are displayed in the respective parameter cells when you press the switch on the instrument. Readings displayed in this way cannot be modified.
Click **Save** to save readings. It is not necessary to enter the total number of readings at one time. A reading must be complete before it can be saved i.e. all parameters mapped to the current instrument must have values. A reading cannot be modified once it is saved.
Click **Close** to return to *Bias Mapping* screen. The **Last Reading Date**, **Last Reading Time** and **Readings Taken** are updated for the parameters for which the reading was taken.

6.3.3 Bias Data Analysis

Select **Bias Study|Data Analysis** from the Measurement Systems Analysis menu to display the *Bias Data Analysis* screen. Use this option to analyze the results of the Bias study carried out for the Instrument. You can only view the data in this screen without making any changes.



Completed studies from all the stations are displayed in this screen. Completed studies are those studies for which all readings have been taken. If no Bias study has been closed from any station then the message 'No studies have been closed' is displayed.
Select **Station No.** from the drop down list which displays all stations from which the Bias study has been carried out and completed. Select **Instrument Code** from the drop down list which displays the instruments for the selected Station No. for which studies have been closed. Select **Part Code** from the drop down list which displays the related parts for the selected Station No. and Instrument Code. Select **Parameter** Code from the drop down list which displays the related parameters for the selected Station No., Instrument Code and Part Code.
Select **% Bias Based On** whether *Tolerance* or *Process Variation*.
Study Date, **End Date** (i.e. the date when the last reading was taken) and **% Bias** for the Station No, Instrument Code, Part Code and Parameter Code are displayed in the grid.
The calculated value of **% Bias** is based on the selection of Process Variation or Tolerance options provided on the screen. If the related value for Process Variation or Tolerance has not been entered, a dash character ("—") is displayed in the **% Bias** column.

6.3.3.1 Bias Report

Click **Report** to view a report displaying details of the bias study of the instrument.

The report contains:

- Details of the Instrument, Part, Parameter and Station on which the readings have been taken.
- The Reading Mode, Reference Value and Number of Readings.
- The Tolerance or Process Variation depending on the selection made in the *Bias Data Analysis* screen.
- Readings, Observed Average, Measurement System Bias and % Bias for the instrument.

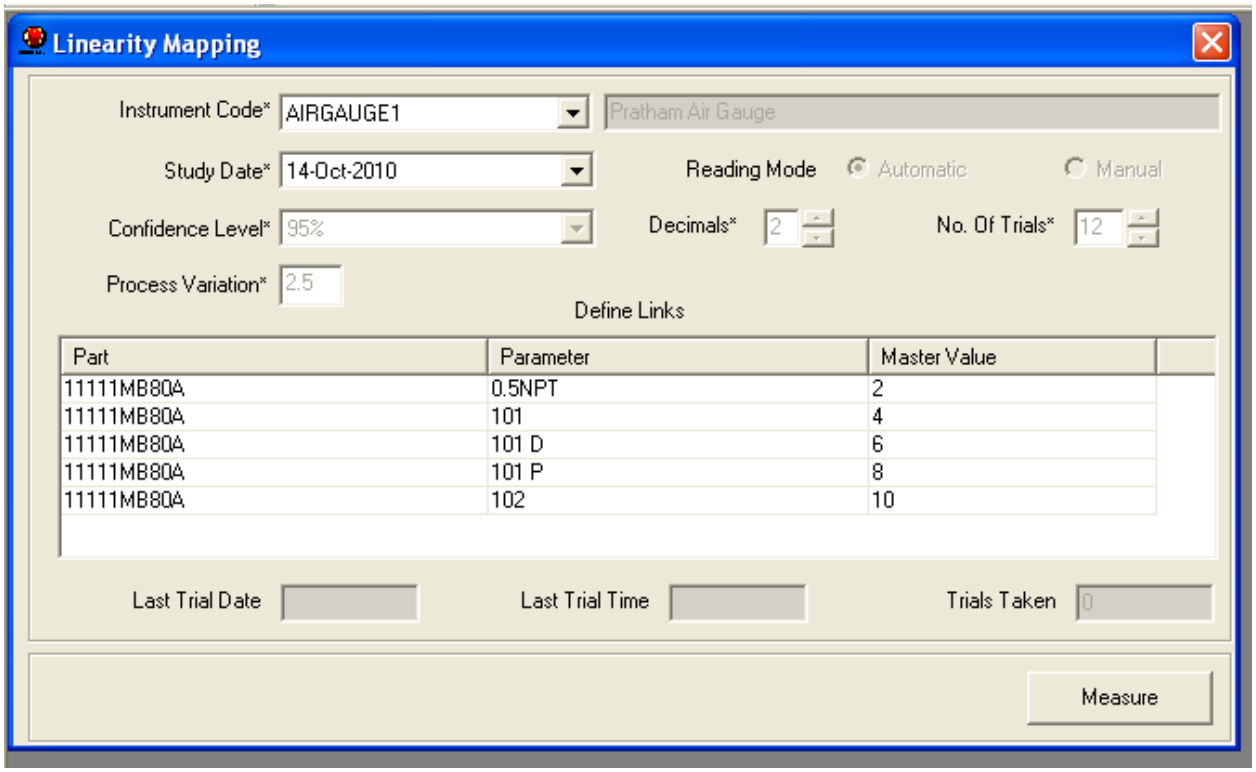
6.4 Linearity

Linearity is the difference in the bias values through the expected operating range of the gauge.
Linearity can be determined by choosing parts throughout the operating range of the measurement instrument. The bias of each one of those chosen parts is determined by the difference between the reference value and the observed average measurement. The slope of the regression line that best fits the bias average versus reference values multiplied by the process variation (or tolerance) of the parts is an index that can represent the linearity of the gauge. To convert gauge linearity to a percentage of process variation (or tolerance), multiply by 100 and divide by the process variation (or tolerance).
As in the bias study, the reference values of the parts can be determined with tool room or layout inspection equipment. Appraiser measures the parts chosen throughout the operating range and the observed average for each part is determined. The difference between the reference value and the observed average is the bias; this is determined for each part chosen. The linearity graph is plotted between biases and reference values

throughout the operating range. If the graph shows that a straight line could represent the plotted points, then a best fit linear regression line between biases and reference values represents the linearity between those two parameters. The goodness of fit (R^2) of the linear regression line will determine whether the biases and reference values have a good linear relationship. Linearity and percent linearity of the system are calculated from the slope of the regression line and the process variation (or tolerance) of the parts. If the regression line has a good linear fit, then the magnitude of the linearity and percent linearity can be evaluated to determine whether linearity is acceptable. If the regression line does not have a good linear fit, then it is possible that the bias has a nonlinear relationship. This requires further analysis to judge whether the measurement system's linearity is acceptable.
Study to find *Linearity* is divided into three parts - *Linearity Mapping*, *Linearity Measurement* and *Linearity Data Analysis.*

6.4.1 Linearity Mapping

Select **Linearity Study|Mapping** from the Measurement Systems Analysis menu to display the *Linearity Mapping* screen. Use this option to map different part-parameter links to the instrument for which Linearity study is to be carried out. Parts selected should be throughout the operating range of the measurement instrument.
The local machine will display all studies mapped on that machine. Once trials for a study are complete, mapping details will not be displayed in this screen.



Click **Add** to add a new record. Select **Instrument Code** from the drop down list displayed from the *Instrument* master. **Study Date** displays the current date. Select a date not less than the current date, if required.
Specify the **Reading Mode –** whether *Automatic* or *Manual.* It is set to *Automatic* by default. Enter **Process Variation.** This is the standard deviation and is used for calculating Linearity and Percentage Linearity to Process Variation.
Select **Decimals** and **No. Of Trials** by clicking the up or down arrow attached to the fields. The default value for **Decimals** is 0 and **No. Of Trials** has a value between 5 and 30.
Process variation is added to calculate %EV i.e. to determine the repeatability is acceptable.

You must enter links in the grid. Links are parts selected throughout the operating range of the instrument. Enter **Part** in the first column, **Parameter** for the part in the second column and **Master Value** for the part and parameter in the third column. You can enter multiple parameters for a part and multiple parts can have the same parameter. The same part-parameter combination can be entered only once.
You can define only as many parameters to an instrument on a study date for a particular part as are specified for the interface code of the instrument.
Click **Save** to save the record.
Click **Modify** to make changes. You can modify **Decimals, Reading Mode, Master Value, No. Of Trials** and **Process Variation** only if trials have not begun for the selected Instrument. If some readings have been taken for the selected Instrument then you can modify only **Decimals** and **Reading Mode.**
Click **Measure** if you wish to go to the *Linearity Measurement* screen to record readings. Measurements can be taken for all links of the selected instrument and study date .
After taking all readings which are specified in the **No. Of Trials** field for the selected Study, that particular study will get closed. The data related to this study is then transferred to the *Linearity Data Analysis* screen.
Click **Delete** to delete a record. You can delete a record for a Local Machine only if trials have not begun for it. For deleting a record, you must specify the Instrument Code and Study Date by selecting them from the respective drop down lists.
In Linearity Chart display the repeatability is acceptable or not depending upon using GRR Result screen.
System will calculate the EV % based on the Sigma Repeatability (Square root method) & Process variation.

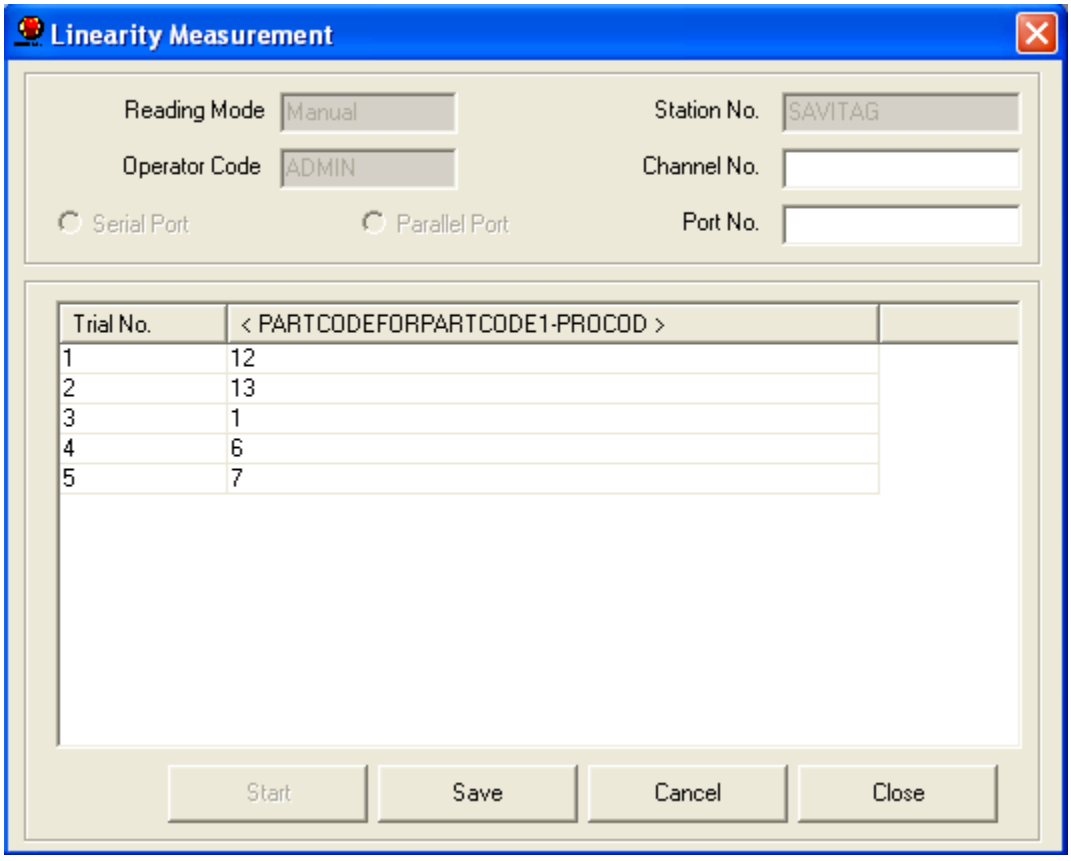
$$\%EV = 100*(SigmaR) / PV$$

Depending upon GRRResult table following result may get varied.

- [%EV] Under 10% - Repeatability is acceptable
- [%EV] 10% to 30% - Repeatability may be acceptable.
- [%EV] Over 30% - Repeatability is Unacceptable.

6.4.2 Linearity Measurement

The *Linearity Measurement* screen is displayed below.



This screen gives you a facility to capture the readings for an Instrument both Manually and Automatically. You can take simultaneous readings for all the parameters mapped for the Linearity Study.

Reading Mode and **Station No.** are displayed from the *Linearity Mapping* screen. The current user is displayed as the **Operator Code.**

For *Manual* Reading Mode, the Operator Code is used to identify by whom the readings were taken. **Channel No.** and Port Details (whether **Serial Port** or **Parallel Port, Port No.)** are not required, hence they are not displayed.

For *Automatic* Reading Mode, Port settings will be displayed based on the selected and connected instrument. If the instrument is connected to a serial port, then the Serial Port value is displayed as **Port No.** If the instrument is connected to a parallel port, then the parallel port number and the channel to which instrument is connected will be displayed as **Port No.** and **Channel No.** respectively.

A grid is provided for taking readings. The first column displays Trial numbers from 1 to '*n'*, where '*n*' is the number of trials specified in the *Linearity Mapping* screen. The balance columns of the grid are for readings. The number of columns for readings is equal to the number of links mapped to the instrument. The readings columns display the "Part Code – Parameter Code" as the headings. e.g. If for the Dumore instrument and Part1, 3 parameters ID1, ID2, ID3 are mapped in the *Linearity Mapping* screen, then the *Linearity Measurement* screen is launched with the provision of three column for the reading values. The reading value column headers have names as Part1-ID1, Part1-ID2, and Part1-ID3 respectively.

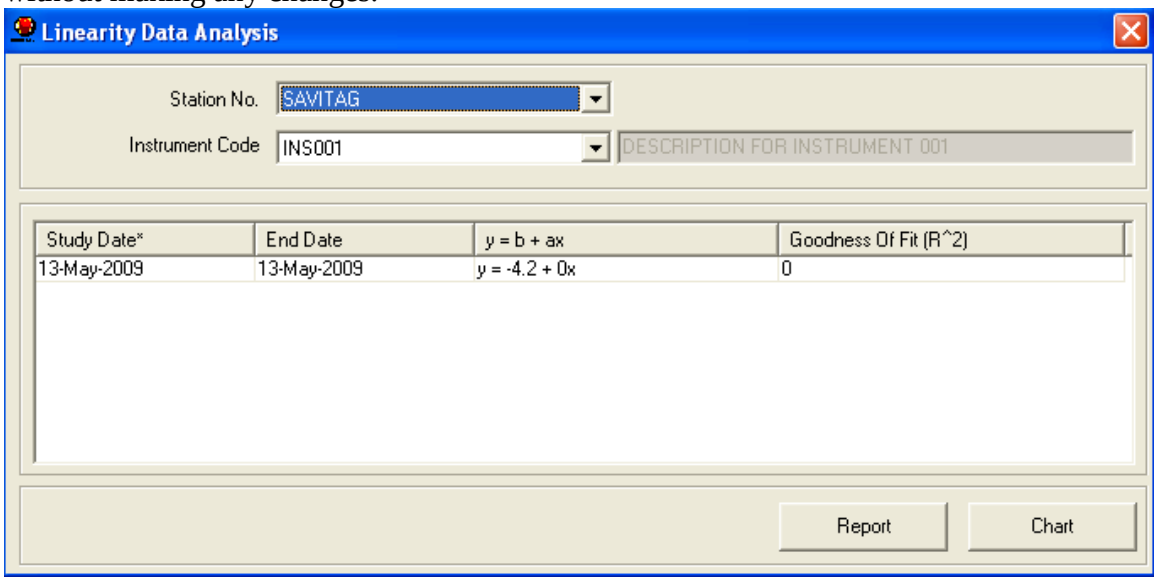
If in the above case, Part2 is also mapped in the mapping screen then there are three more readings columns for Part2 links.

Existing readings will be displayed in the grid, but they cannot be changed.
The **Start** button is enabled only when the reading mode is Automatic.
Click **Modify** to make changes. You can modify **Channel No.** and **Port No.** only if the reading mode is *Automatic*. . If the instrument selected is connected to a serial port, then you can modify only **Port No.** If the instrument selected in the study is connected to a parallel port, then you can modify only **Channel No.**

Taking Measurements
In *Manual* mode, you can enter readings directly into the grid for the parameters in the respective columns. You can modify readings only until they are saved.
In *Automatic* mode, select the row in the grid. Click **Start.** The readings are displayed in the respective parameter cells when you press the switch on the instrument. Readings displayed in this way cannot be modified.
Click **Save** to save readings after all readings for a particular trial have been taken. You cannot save only a part of the readings for the trial. A reading cannot be modified once it is saved.
Click **Close** to return to *Linearity Mapping* screen. The **Last Trial Date**, **Last Trial Time** and **Trials Taken** are updated.

6.4.3 Linearity Data Analysis

Select **Linearity Study|Data Analysis** from the Measurement Systems Analysis menu to display the *Linearity Data Analysis* screen. Use this option to analyze the results of the Linearity study carried out for the Instrument. You can only view the data in this screen without making any changes.



Completed studies from all the stations are displayed in this screen. Completed studies are those studies for which all readings have been taken. If no Linearity study has been closed from any station then the message 'No studies have been closed' is displayed.
Select **Station No.** from the drop down list which displays all stations from which the Linearity study has been carried out and completed. Select **Instrument Code** from the drop down list which displays the instruments for the selected Station No. for which studies have been closed.
Study Date, **End Date** (i.e. the date when the last trial was taken), **% Linearity** and **Goodness Of Fit (R^2)** are displayed in the grid.

6.4.3.1 Linearity Report

Click **Report** to view a report displaying details of the linearity study of the instrument. The report contains:

- Details of the Instrument and Station on which the readings have been taken.
- The Reading Mode, the different Part-Parameter Links to the instrument and Number of Trials.
- The Reference value, Readings, Part Average, Bias, Range, Linearity, % Linearity, Goodness of Fit (R*R) and Slope of Regression Line for the instrument.

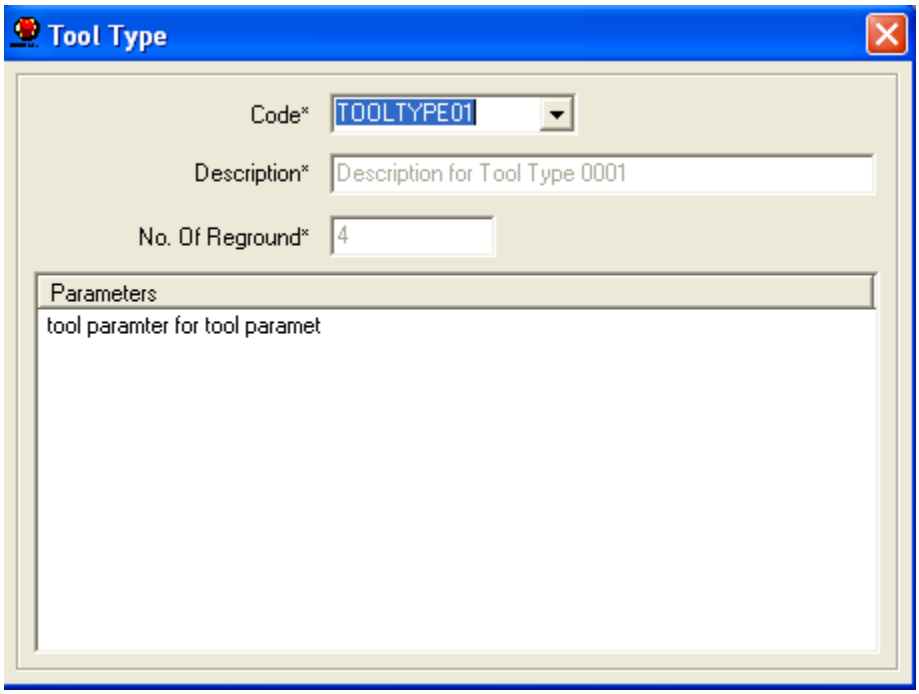
6.4.3.2 Linearity Chart

Click **Chart** to view a graphical image of the details of the linearity study of the instrument. The Linearity Chart plots the Bias and Reference Values for all the Parts.

7 Tool Life Monitoring

7.1 Tool Type

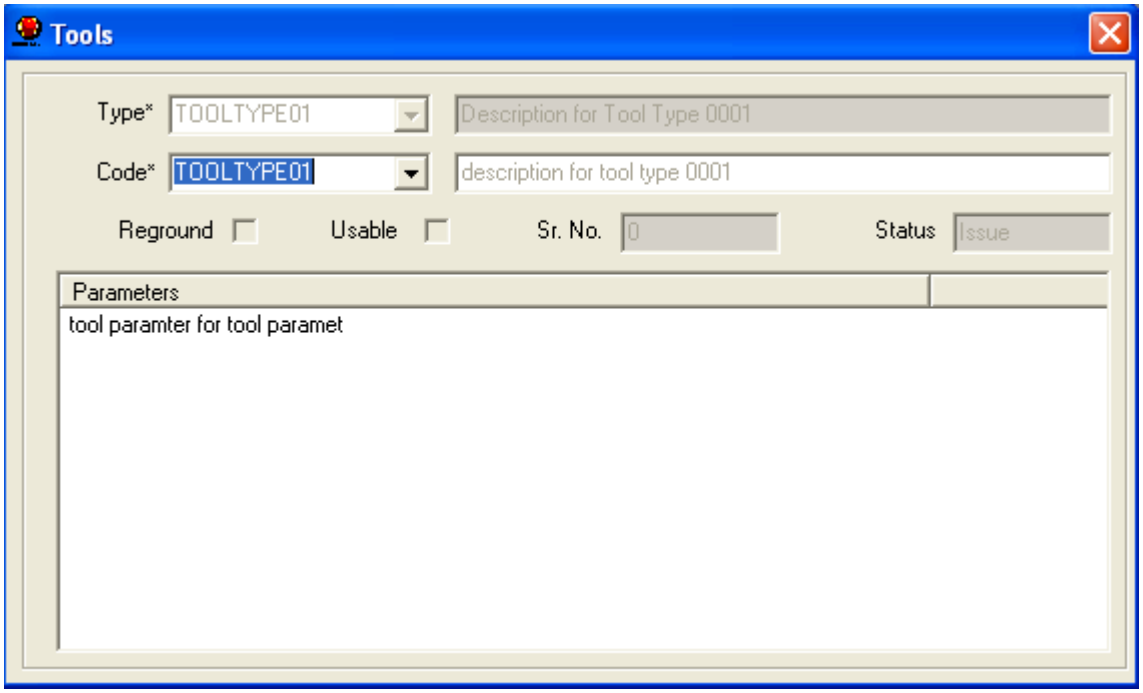
Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select Tool Type option to display *Tool Type* screen. *Tool Type* screen is displayed below.



Click on the **Add** button and add the tool **Code** along with its **Description** and also the Regrinding options and also specify the parameters. The **No Of Reground** value specifies the optimum no of times the tool can be reground. You have to select the parameters for the tool type. You may select the parameters from the parameters list for this tool type by checking in the boxes in front of their names. You can modify the Tool Type by clicking on the **Modify** button. You can modify the **Description**, **No Of Reground** and select new **Parameters** or deselect previously selected **Parameters.** You can modify the tool type only if tools have not been defined for the **Tool Type** in the *Tools* master or if the **Tool Type** is not linked to any **Operation**. You can delete the **Tool Type** by clicking on the **Delete** button. You can delete the tool type only if tools have not been defined for the tool type or if the tool type is not linked to any operation. Click on **save** button to save the added/modified record.

7.2 Tool Master

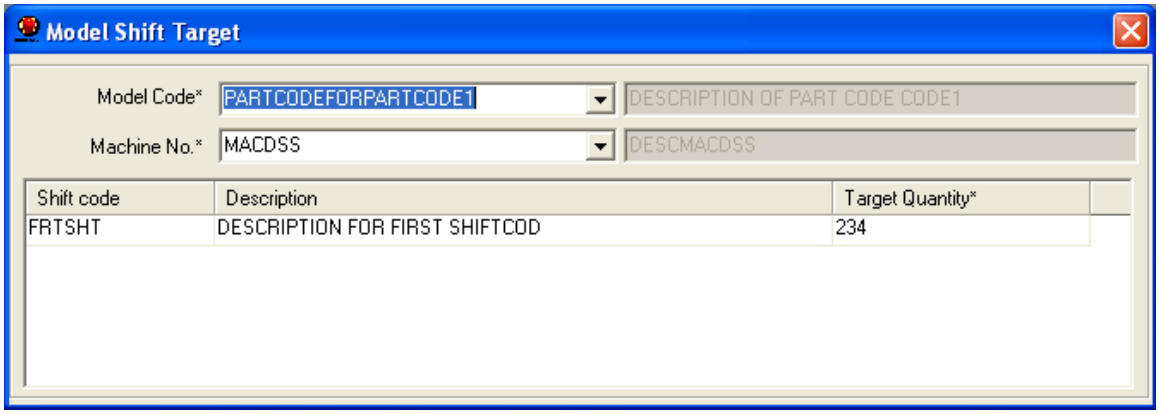
Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select Tool Master option to display *Tool Master* screen. *Tool Master* screen is displayed below.



The *Tool Master* displays the information of the tool and its parameters. Click on **Add** button to add a tool for a *Tool Type*. You can choose the **Tool Type** code from the drop-down list box. You have to enter the **Code** and **Description** for the tool. The **Parameters** of the selected **Tool Type** are listed in the table on the screen, but you cannot change the parameters. Click on **Save** button to save the tool.
You can modify the details of the Tool by clicking on the **Modify** button. If the status of the tool is reground, then you can regrind the tool by modifying the tool and checking the **Reground** checkbox. After regrinding the **Sr. No.** of the tool increments by one, **Status** of the tool becomes usable and this tool can be used for production. If the **Status** of the tool is Non-usable, then you can modify the tool and set the **Status** to usable, by checking the usable checkbox. After checking the usable checkbox, **Sr. No**. does not change. If the tool is being used in Production, then the **Status** of the tool is displayed as Issue. Tools with **Status** Usable are the tools that can be issued for production.
You can delete the tool, by clicking on the **Delete** button. You can delete a tool, only if it has never been used for production.

7.3 Model Shift Target

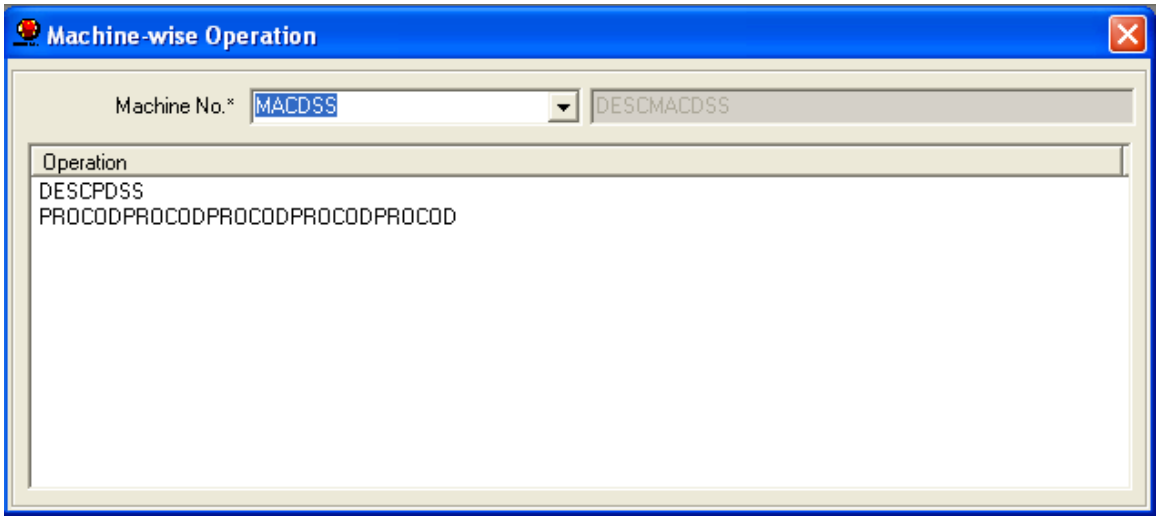
Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select Model Shift Target option to display *Model Shift Target* screen. *Model Shift Target* screen is displayed below.



The *Model Shift Target* dialog box displays the **Model Code** and the **Machine No**. Based on the **Model Code** and **Machine No** information related to the **Shift Code**, **Shift Description** and **Target Quantity** are displayed. This screen is used to capture data for the target quantity that should be produced for a Model on a machine during a shift. Click on the **Add** button to add a record. Select the Model from the **Model Code** drop down list box. Select the Machine No from the **Machine No.** drop down list box. All the Shifts defined in the *Shifts* master are displayed. You have to specify the **Target Quantity** for at least one shift. If some more shifts are added to the *Shifts* master after defining the Model Shift Target, then select the record from the Model Shift Target and modify it. Click on **Modify** button to modify the record. You can modify the target quantity and also specify the target quantities for the shifts that were defined later. You can delete the record by selecting the record and clicking on the **Delete** button. Click on **Save** button to save the added/modified record.

7.4 Machine Wise Operation

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select Machine Wise Operation option to display *Machine Wise Operation* screen. *Machine Wise Operation* screen is displayed below.



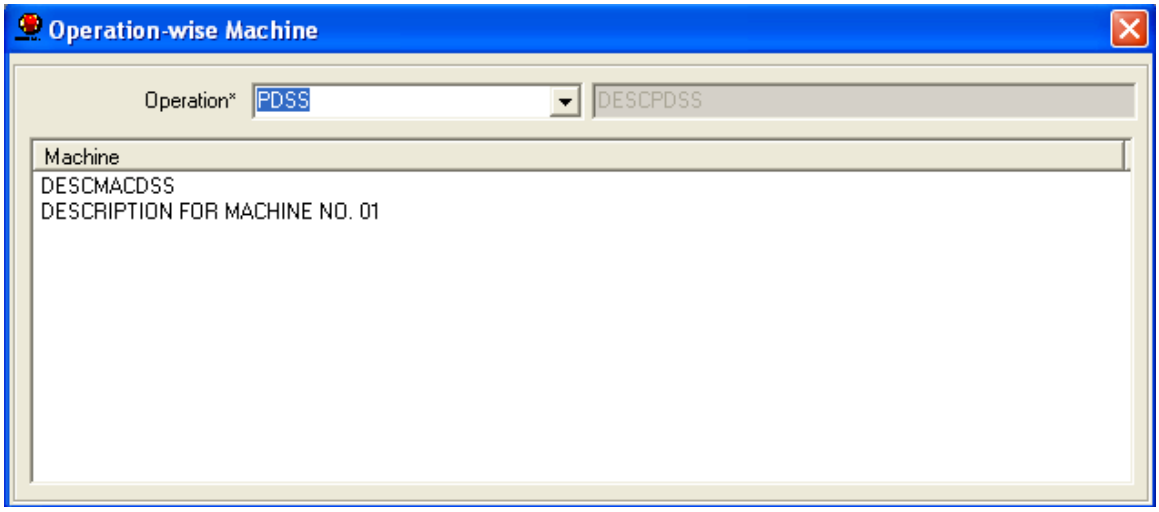
Machine Wise Operation dialog box gives the detailed information about the machine number and the operations that can be carried out on the machine. The link between the Machine and the Operation is defined here. All the operations that can be carried out a machine can be selected. Click on **Add** button to add a link between the Machine and Operation. Select a **Machine** from the drop down list box. All the operations that are defined in the *Process* master are displayed in the list below the drop down list box. Select the operations by checking in the checkbox corresponding to the **Operation** that has to be linked to the **Machine**. At least one **Operation** has to be selected for a **Machine**. After selecting the **Machine** and its **Operation**, click on **Save** button to save the link.

You can change the selection of **Operations** for a **Machine** by modifying the record. Click on **Modify** button to modify the machine – operation link. Modification of a record is allowed only if model has not been defined for the selected Machine, in the *Model Tool Link* screen.

Click on **Delete** button to delete a link. You can delete the machine – operation link, only if model has not been defined for the selected **Machine**, in the *Model Tool Link* screen.

7.5 Operation Wise Machine

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select Operation Wise Machine option to display *Operation Wise Machine* screen. *Operation Wise Machine* screen is displayed below.



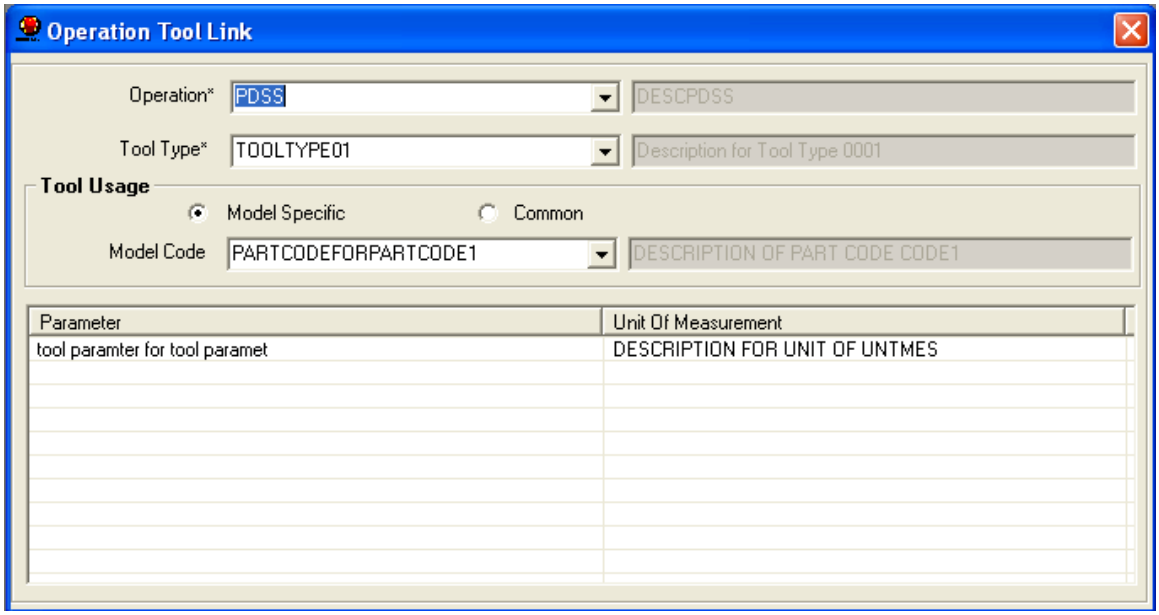
Operation Wise Machine dialog box gives the detailed information of the types of operations performed on the machines. The link between the Operation and the Machine is defined here. All the operations that can be carried out a machine can be selected. Click on **Add** button to add a link between the Operation and Machine. Select an **Operation** from the drop down list box. All the machines that are defined in the *Machine* master are displayed in the list below the drop down list box. Select the machines by checking in the checkbox corresponding to the **Machine** that has to be linked to the **Operation**. At least one machine has to be selected for an operation. After selecting the **Operation** and its **Machine**, click on **Save** button to save the link.

You can change the selection of machines for an operation by modifying the operation – machine link. Click on **Modify** button to modify the operation – machine link. Modification of a record is allowed only if model has not been defined for the selected Operation, in the Model Tool Link screen.

Click on **Delete** button to delete a link. You can delete the operation – machine link, only if model has not been defined for the selected **Operation**, in the *Model Tool Link* screen.
.

7.6 Operation Tool Link

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select Operation Tool Link option to display *Operation Tool Link* screen. *Operation Tool Link* screen is displayed below.



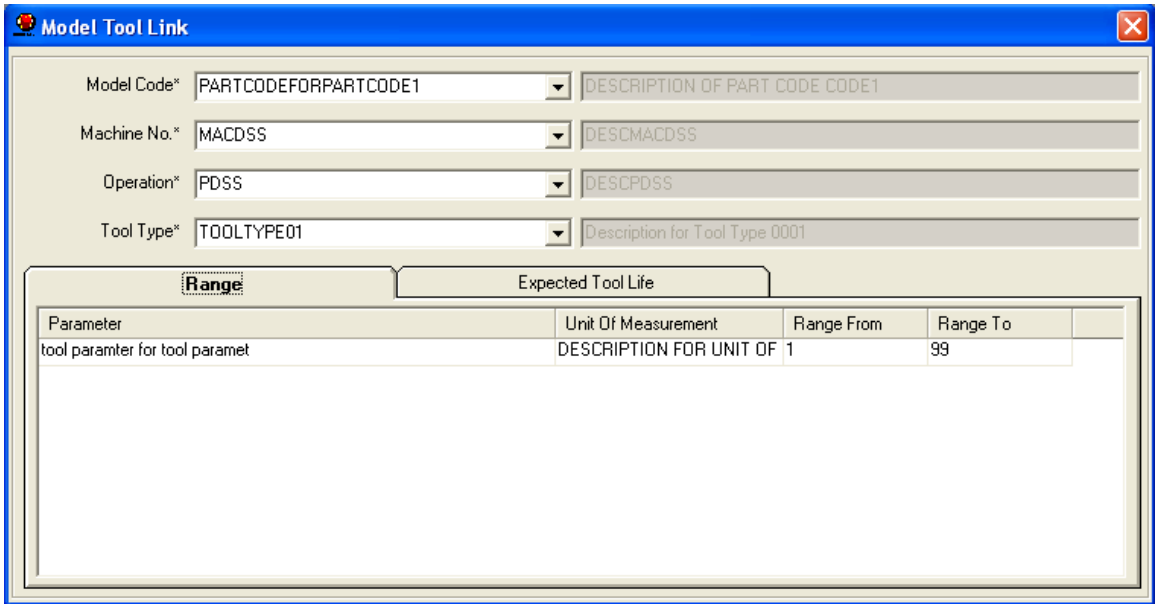
Operation Tool Link dialog box gives information about the **Operation** in association with the **Tool Type** also its usage defined along with the **Parameters** and **Unit Of Measurement**. In this screen the link between the operation and tool types are defined. You can specify the usage of the tool, i.e. whether the tool type is specific to a model or if it is a common tool type. You can select the parameters of the tool type and also specify its unit of measurement.
To add a link for operation and tool type, click on the **Add** button. All the operations defined in the *Process* master are displayed in the **Operation** drop down list box. Select an **Operation** and then a tool type from the **Tool Type** drop down list box. By default the **Tool Usage** is common. If the **Tool Type** is specific to a model, then click on the **Model Specific** option button and also select its corresponding Model from the **Model Code** drop down list box. The **Parameters** of the **Tool Type** are displayed in the list provided in the screen. Checkboxes are provided for each parameter. For selecting a parameter, check the checkboxes corresponding the parameter. On checking a checkbox, a drop down list box is displayed under the column entitled **Unit Of Measurement**. The units of measurements defined in the *Unit Of Measurement* screen are available in the drop down list box. Select the appropriate unit of measurement for the parameters. Click on **Save** button, to save the added link.

Click on **Modify** button to modify the record. You can Modify the **Tool Usage**, select or deselect **Parameters** and change the **Unit Of Measurement**, only if **Model** has not been defined for the selected **Operation** and **Tool Type**, in the *Model Tool Link* screen.

Click on **Delete** button to delete the record. You can delete a record, only if **Model** has not been defined for the selected **Operation** and **Tool Type**, in the *Model Tool Link* screen.

7.7 Model Tool Link

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select *Model Tool Link* option to display *Model Tool Link* screen. *Model Tool Link* screen **Range** tab page is displayed below.

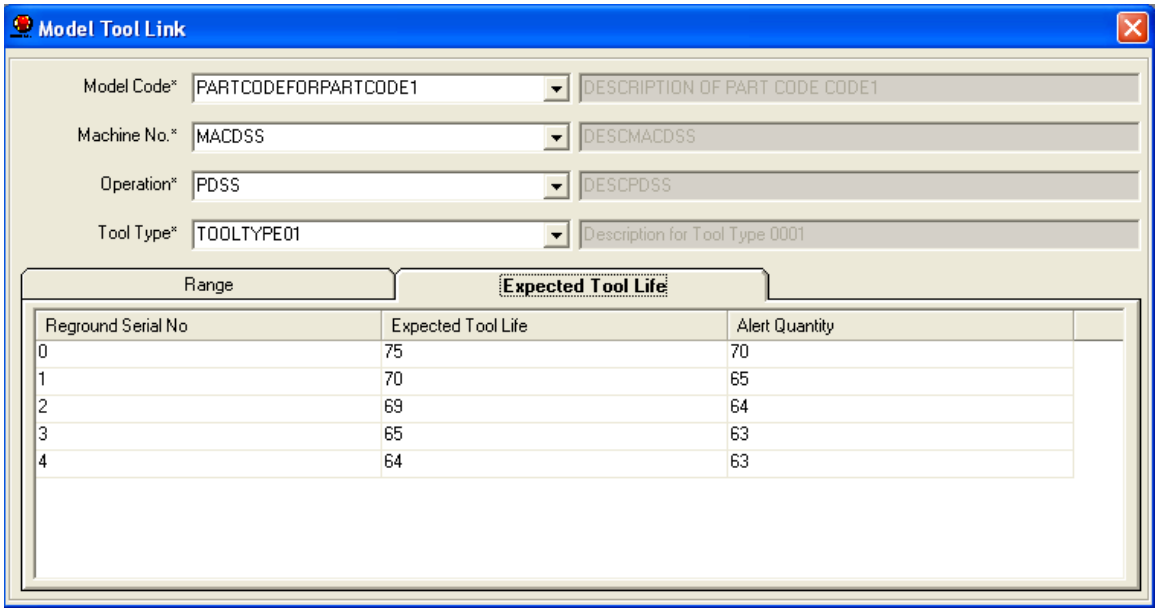


Model Tool Link dialog box displays the information about the **Model Code**, **Machine No.**, **Operation** and the **Tool Type**. The lower portion of the screen has two tab pages for **Range** and the **Expected Tool Life**. The model for a machine, operation and tool type can be defined in this screen.

To add a Model and Tool Link, the user can click on the **Add** button. Select the Model from the **Model Code** drop down list box. On selection of a model, its description is displayed in the adjoining text box. Similarly select the **Machine No.**, **Operation** and **Tool Type**. All the machines defined in the *Machine wise Operation* screen or *Operation wise Machine* screen are displayed in the **Machine No.** drop down list box. If Machine and Operation link has not been defined then message will be displayed while adding the Model Tool Link. After selecting the **Machine No.**, select the **Operation**. All the operations that have been defined for the selected **Machine No.** are displayed in the **Operation** drop down list box. Tool types defined for the selected **Operation** are displayed in the **Tool Type** drop down list box.

Range and **Expected Tool Life** tab pages display values for the selected **Tool Type.** Parameters defined for the selected **Tool Type** and **Operation** are displayed in the **Range** grid along with the **Unit Of Measurement**. The **Range From** and **Range To** fields determine the operating range value for the tool type parameters. Enter the From and To Range for all the parameters.

Expected Tool Life grid displays the **Expected Tool Life** and **Alert Quantity** for each **Reground No. Reground No.** column displays value from 0 to the no. of optimum reground specified in the *Tool Type* screen. You have to enter the **Expected Tool Life** and **Alert Quantity** for each reground. The **Expected Tool Life** for a **Reground No** should be less than or equal to the **Expected Tool Life** of the previous reground. **Alert Quantity** for each reground should be less than or equal to its corresponding **Expected Tool Life**. Click on the **Save** button to save the record. *Model Tool Link* screen **Expected Tool Life** tab page is displayed below.

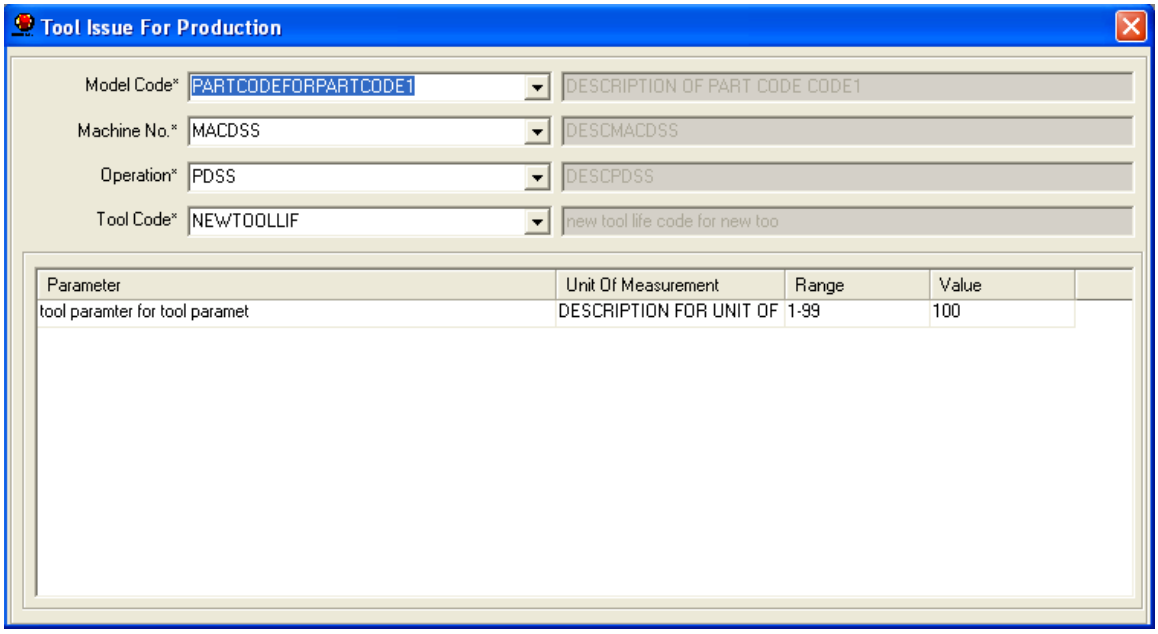


You can modify only the **Range From**, **Range To**, **Expected Tool Life** and **Alert Quantity** for a **Model**, **Machine No.**, **Operation** and **Tool Type**. For modifying the record, you have to select **Model**, **Machine No**, **Operation** and **Tool Type**. If tools have been issued for the selected **Model, Machine No, Operation** and **Tool Type**, then while modifying the **Range From** and **Range To** values, if the values entered violate the operating value for the tool issued, then message is displayed stating that specified range is violating parameter values defined in *Tool Issue*.

You can delete a record, if tools have not been issued for the selected **Model**, **Machine No**, **Operation** and **Tool Type**. If tools have been issued then message is displayed stating that the record cannot be deleted since it is referenced in *Tool Issue*.

7.8 Tool Issue For Production

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select *Tool Issue For Production* option to display *Tool Issue For Production* screen. *Tool Issue For Production* screen is displayed below.



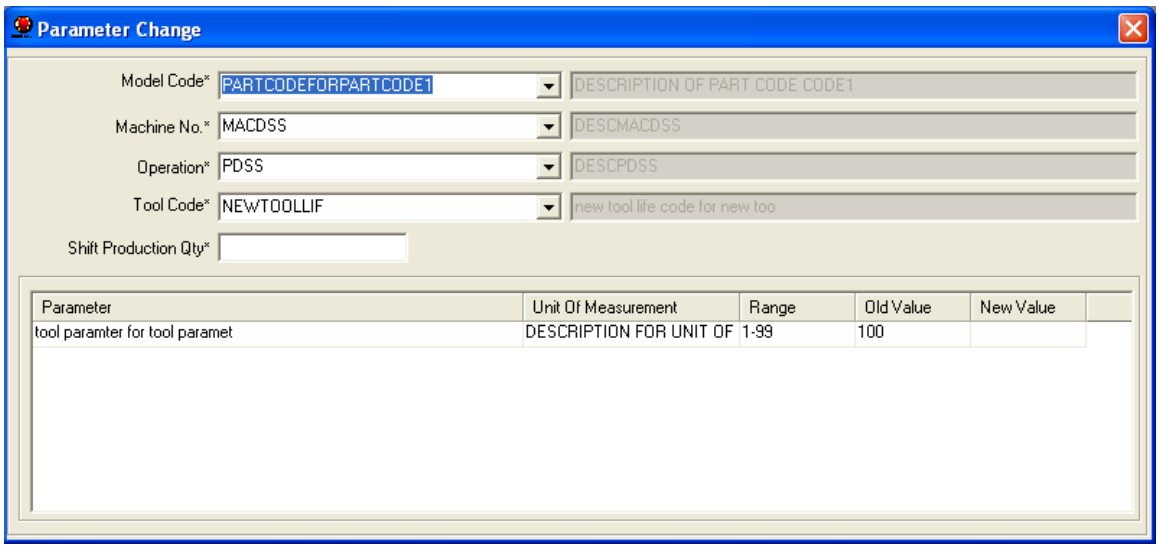
This screen displays the complete information about the tools issued for a model, machine and operation. Click on the **Add** button to issue tools. Select the **Model**, its corresponding **Machine No.**, **Operation** and then the **Tool Code** for the tool to be issued. After selecting all the above-mentioned fields, the **Parameters** for the tool are displayed in the grid, along with the **Unit Of Measurement**, preferred operating **Range** of the tool parameter and the actual **Value**. While adding the tool i.e. issuing the tool enter data into the **Value** field. The **Value** for each parameter should lie within the **Range** specified for each parameter. This **Value** is the value at which the tool parameter shall be actually operated.

Select the record to be modified and click on **Modify** button. You can modify the parameter operating **Value**, only if production has not been started with the tool. If production has started then while trying to modify the record, message shall be displayed stating ‘Cannot Modify. Production done’.

For deleting a record, select the record and click on **Delete** button. You can delete the record, only if the tool has not started production for the selected **Model**, **Machine** and **Operation**. If the production has started then while trying to delete the record, message shall be displayed stating ‘Cannot Delete. Production done’.

7.9 Parameter Change

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select *Parameter Change* option to display *Parameter Change* screen. *Parameter Change* screen is displayed below.

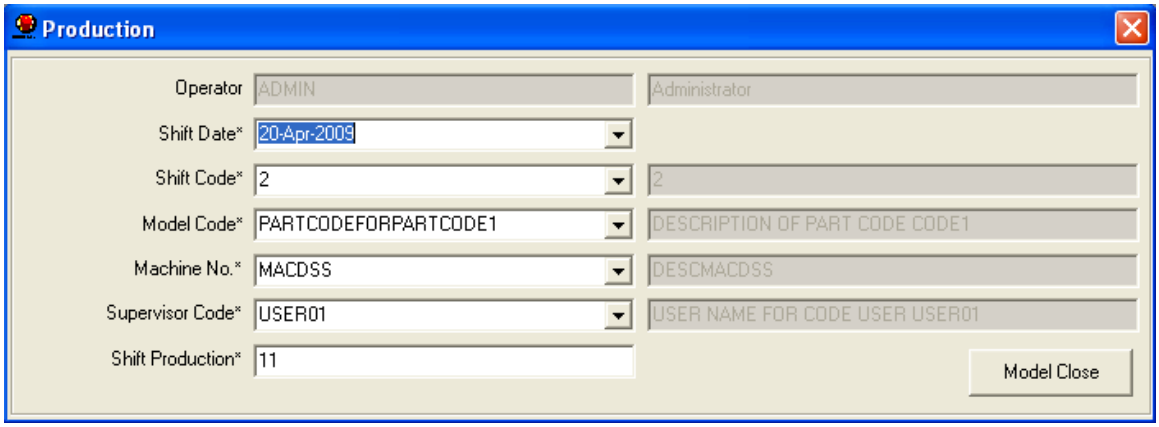


Once the production for a tool has been started for a **Model**, **machine** and **Operation**, the parameter operating values can be modified through the *Parameter Change* screen. All the tools that are currently being used for production are listed in this screen. You are not allowed to Add or Delete any record in this screen.

For changing the parameter value, select the **Model**, **Machine No.**, **Operation** and **Tool code**, and click the **Modify** button. The grid on the screen displays the **Parameter**, along with **Unit Of Measurement**, **Range**, **Old Value** and **New Value**. Enter the quantity produced by the tool till the time the parameter was changed, in the **Shift Production Qty** textbox. You can specify new parameter value for one or all the parameters for the tool. The **Old Value** column displays the current parameter value; the new value for the parameter has to be entered in the **New Value** column. If the **New Value** entered is not within the **Range** specified for the parameter, then message shall be displayed 'New value is not within the range. Do you want to accept?'. You can save the **New Value** by clicking on the **Save** button. The **Old Value** for the parameter shall be updated with the **New Value** that was entered. If the **New Value** entered is within the **Range** of the parameter, then on saving the **Old Value** shall be updated without displaying any message.

7.10 Production

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select *Production* option to display *Production* screen. *Production* screen is displayed below.



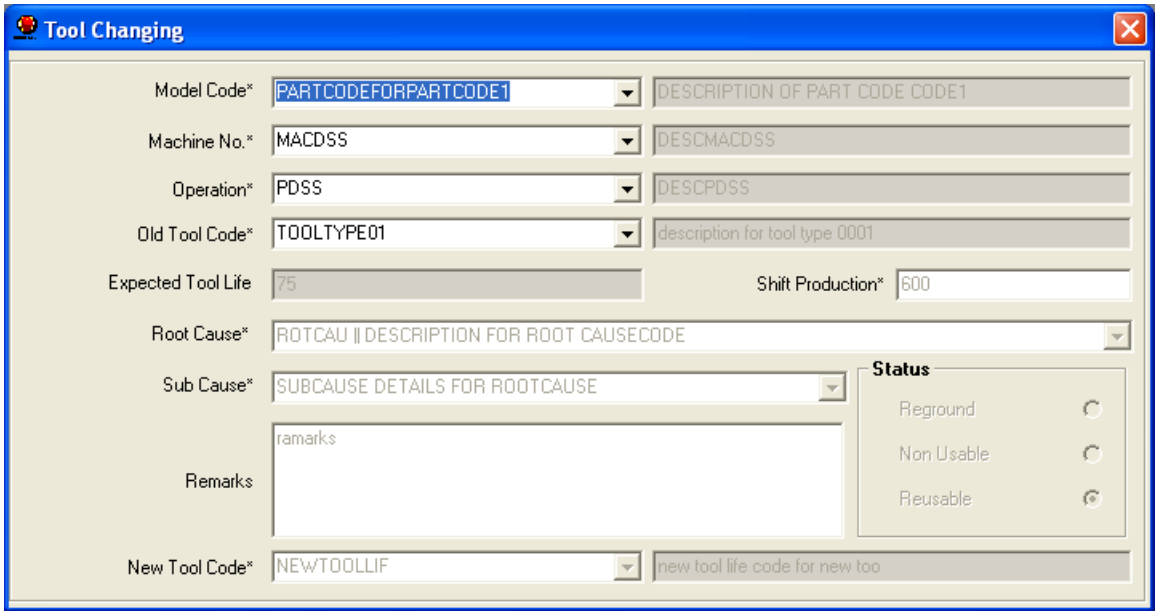
Production done for a **Model** on a **Machine No.** for a particular **Shift Date** and **Shift Code** is specified in this screen. Click on the **Add** button to enter the production. Select the **Shift Date**, **Shift Code**, **Model Code**, **Machine No.**, **Supervisor Code** and enter the **Shift Production**. On click of the **Add** button, by default the current **Shift Code** is displayed. If model has been defined for the local machine, then that model and machine shall be displayed in the **Model Code** and **Machine No.** drop down list box. You cannot enter production for shift dates greater than the current date. Click on **Save** button to save the record. After saving the record, if the quantity produced by the tool is nearing or has exceeded its **Expected Tool Life** then corresponding screens shall be launched, which shall display the expected quantity and the produced quantity.

You can modify the **Shift Production** only for the current **Shift Date**. Back dated production quantity cannot be modified. You can delete the record only for the current shift date. Back dated record cannot be deleted. Click on the **Delete** button to delete the record.

Model Close facility is also provided from this screen. If the production for one model has been completed and you want to start with another model, then the previous model can be closed by clicking on the **Model Close** button. Select the model that is to be closed, and then click on the **Model Close** button, which shall launch a screen for selecting the new model. While closing model, the model shall be closed only for the machine that was selected for Model closure.

7.11 Tool Changing

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select *Tool Changing* option to display *Tool changing* screen. *Tool changing* screen is displayed below.



If the life of a tool has been completed or for some reasons the tool has to be changed then the tool can be changed through this screen. For changing a tool, click the Add button. Select the **Model**, **Machine No**, **Operation** and **Old Tool Code**. By default the Model defined for the local machine shall be displayed in the **Model Code** drop down list box. **Old Tool Code** is the tool that has to be changed. On the selection of the **Old Tool Code**, the expected tool life for that tool is displayed in the **Expected Tool Life** textbox. Enter the production done for the shift till the time the tool was changed, in the **Shift Production** textbox. Select the **Root Cause** and **Sub Cause** for tool change. Remarks if any for tool change can be entered in the **Remarks** textbox. Select the **Status** of the **Old Tool Code**, i.e. whether the old tools should be reground, or if the tool is re-usable or non-usable. Select the new tool code, from the **New Tool Code** drop down list box, or if the tool to be selected is not present in the drop down list box, then you can directly type the tool code in the drop down list box. After selecting the new tool, you can save the record, by clicking on the **Save** button.

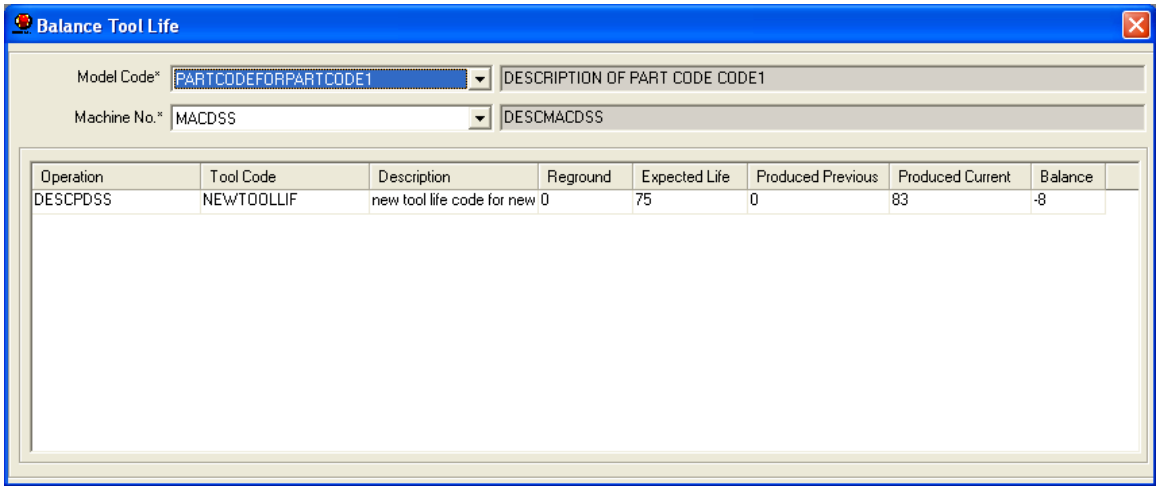
If the **Status** of **Old Tool Code** has been selected as **Reground** and the old tool code has already been reground for the optimum no of times as mentioned in the *Tool Type* screen, then a confirmation message shall be displayed stating that the tool has exceeded the optimum no of reground, do you want to continue with reground.
If the **Status** of the selected **New Tool Code** is **Reground** in the *Tool Master* screen, then **Reground Serial No** for the tool shall be incremented by one. If there are no records for the new reground no's **Expected Tool Life** and **Alert Quantity** in the *Model Tool Link* screen, then you shall be prompted to enter the **Expected Tool Life** and **Alert**

Quantity for the **Reground Serial No**. The entered **Expected Tool Life** should be less than or equal to that of the previous reground Serial No from *Model Tool Link* screen for that **Model**, **Machine No**, **Operation**, **Tool Type Code**. The **Alert Quantity**, should be less than or equal to its corresponding **Expected Tool Life** just entered for the **New Tool Code**, **Reground Serial No**.

You can modify only the last record that was added, by clicking the **Modify** button. **Shift Production**, **Root Cause**, **Sub Root Cause**, **Remarks**, **Status** and **New Tool Code** can be modified. You cannot delete any record on this screen

7.12 Balance Tool Life

Tool life monitoring is included in the product installed then click on Tool Life monitoring menu and select *Balance Tool Life* option to display Balance Tool Life screen. *Tool changing* screen is displayed below.

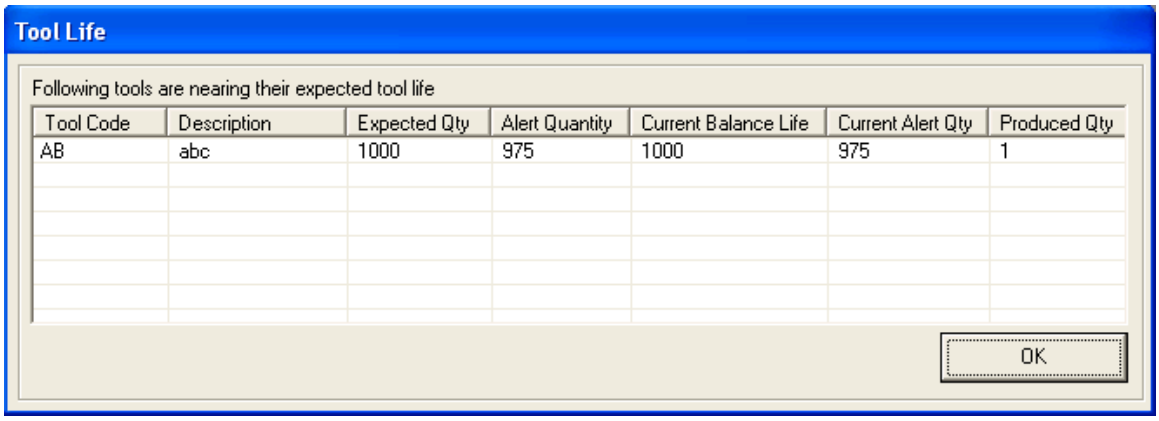


Balance Tool Life screen displays the information about the tools that are being used for Production for a **Model Code** and **Machine No**. By default this screen displays the **Model Code** and **Machine No** for the local machine, if no records exist for the local machine, then the first Model from the **Model Code** drop down list box shall be displayed. You cannot Add, Modify or Delete any record on this screen. The grid on this screen displays data for the **Model Code** and **Machine No** selected in the drop down list box. The grid displays the **Operation**, **Tool Code**, **Tool Description**, **Reground**, **Expected Tool Life**, **Produced Previous**, **Produced Current** and **Balance**.

Reground – It is the current reground serial no for the **Tool Code**
Expected Tool Life – It is the Expected Tool Life for the Tool Code for a Model, Machine, Operation and Reground Serial
Produced Previous – It is the quantity produced by the **Tool Code** if that tool was previously used for Production of some **Model**
Produced Current – It is the quantity produced by the **Tool Code** for the selected **Model** and **Machine**
Balance – It is the quantity that can be produced by the **Tool Code** so that it reaches its **Expected Tool Life**.

7.13 Tool Life Nearing screen

This screen is displayed after entering the Production in the *Production* screen, if the tools are nearing their expected tool life. The screen is displayed below.



If the quantity produced by a tool has exceeded or is equal to its **Alert Quantity** but is less than its **Expected Tool Life**, then this screen is displayed. The screen displays a list of all the tools that are nearing their expected tool life.

Tool Code and **Tool Description** display the Tool code and its description for the tools that are nearing their expected tool life.

Expected Qty and **Alert Qty** columns display the Expected Tool Life and Alert quantity as entered for the **Tool Type** and its particular **Reground Serial No.** in the *Model Tool Link* screen.

Current Balance Life is the amount, which can be produced by the Tool, so that its total production is equal to its expected tool life. **Current Balance Life** is calculated on the basis of the percentage balance life of the Tool. **Percentage Balance life** is the quantity which can be produced by the tool after some production has been done. For e.g. if expected tool life of a tool is 1000 and 250 has been produced by the Tool, then its Percentage Balance Life is 75%, which means that 75% of its expected tool life can be produced by the Tool.

Percentage balance life = (100 – ((100 * Total Production) / Expected Tool Life from *Model Tool Link*))

Current Balance Life = (Expected Qty from *Model Tool Link* * Percentage Balance Life)/100
If a tool has been used in more than one model, then the **Current Balance Life** denotes the quantity that can be produced by that tool for the selected **Model** and **Machine**, based on its Expected tool life and Percentage Balance Life.

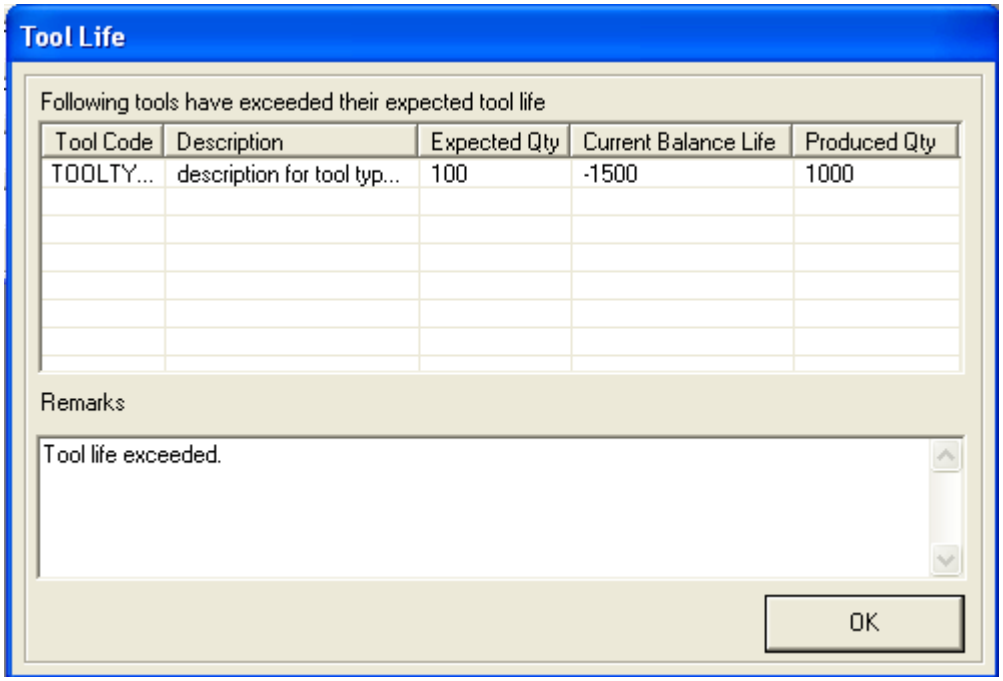
Current Alert Quantity is the amount, which can be produced, so that the total production is equal to the alert quantity.

Current Alert Qty = (Alert Qty from *Model Tool Link* –
(Expected Qty from *Model Tool Link* * (100 - Percentage Balance Life) / 100)

Produced Qty is the total amount that has been produced by the **Tool Code** for the **Model** and **Machine**.

7.14 Tool Life Exceeded Screen

This screen is displayed if the production entered in the *Production* screen causes the tool to exceed its expected tool life. The screen is displayed below.



The screen displays a list of all the tools that have exceeded their **Expected Tool Life**. A textbox is provided for **Remarks** to be entered by the supervisor.

Tool Code and **Tool Description** display the Tool code and its description for the tools that are nearing their expected tool life.

Expected Qty column displays the Expected Tool Life as entered for the **Tool Type** and its particular **Reground Serial No.** in the *Model Tool Link* screen.

Current Balance Life is the amount, which can be produced by the Tool, so that its total production is equal to its expected tool life. **Current Balance Life** is calculated on the basis of the percentage balance life of the Tool. **Percentage Balance Life** is the quantity that can be produced by the tool after some production has been done. For e.g. if expected tool life of a tool is 1000 and 250 has been produced by the Tool, then its Percentage Balance Life is 75%, which means that 75% of its expected tool life can be produced by the Tool.

Percentage balance life = (100 – ((100 * Total Production) / Expected Tool Life from *Model Tool Link*))

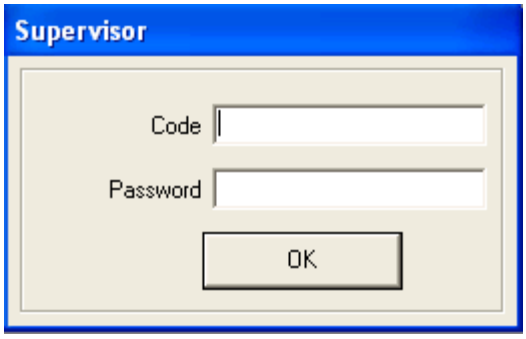
Current Balance Life = (Expected Qty from *Model Tool Link* * Percentage Balance Life)/100

If a tool has been used in more than one model, then the **Current Balance Life** denotes the quantity that can be produced by that tool for the selected **Model** and **Machine**, based on its **Expected Tool Life** and **Percentage Balance Life**.

Produced Qty is the total amount that has been produced by the **Tool Code** for the **Model** and **Machine**.

7.15 Supervisor Login screen

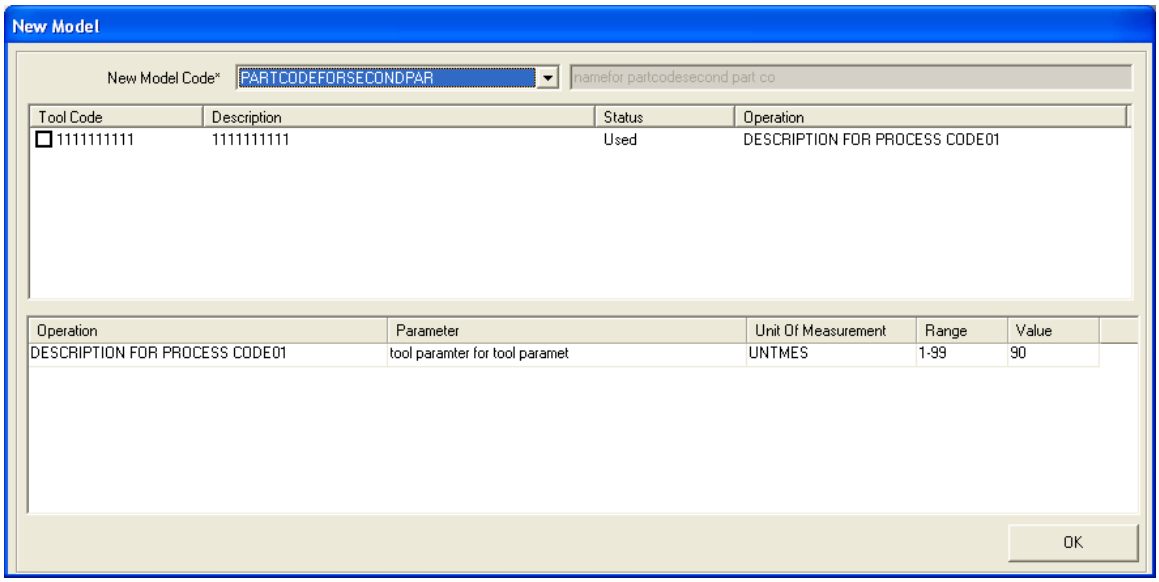
This screen is displayed if the production entered in the *Production* screen causes the tool to exceed its expected tool life. Login screen is displayed, and only the supervisor is allowed to log into the screen. The supervisor login screen is displayed below.



If the **Code** and **Password** entered are of a valid supervisor then the *Tool Life Screen* (exceeded) is displayed. All the users defined in the *Supervisor master* screen are referred as Supervisors.

7.16 Model Close screen

Model Close screen is launched from the *Production* screen on the click of **Model Close** button. Model Close screen is displayed below.



Model Close screen consists of a **New Model Code** combo, a list view and a grid. **New Model Code** combo is populated with all the Models defined in *Model Tool Link* except the Model, which is selected for closing. The List view displays the **Tool Code**, **Description**, **Status** and **Operation**. For more information on **Status**

The grid displays the **Operation**, **Parameter**, **Unit Of Measurement**, **Range** and **Value**. Select the new model from the **New Model Code** combo. On selection of the Model from the combo, the textbox corresponding to the **Model Code** combo displays the description of the selected Model, the list view is populated with all the tool codes, which are applicable to the selected **Model** and the **Machine** for which the **Model** was closed. If the selected **Model** is a model, which was closed earlier, then all the tools that were used by the Model when it was closed shall be displayed along with all the other tools that are applicable to the **Model** and **Machine**.

Every item in the list view also displays the **Operation** linked to the tool. The list view consists of checkboxes for each list view item. Select the Tools from the List view to issue the tools for the new model. You can check or select only the tools that have their status as **Used** or **Available**. You cannot select tools with status as **Reground** or **Non Usable**. These tools are displayed only for displaying the information about the tools that were used. If you try to select such a tool then message is displayed stating that the tool cannot be used.

On selection of a tool from the list view, the grid below the list view displays all the parameters applicable to the tool, along with the operation of the tool and unit of measurement for the Parameter, Range of the Parameter and the value for the Parameter.

If a tool is listed more than once in the list view for different Operations, then you can select only one tool from it. If you try to select the same tool more than once then a message shall be displayed stating that the tool has already been selected. You have to select at least one tool for the new model. After selecting the Tools to be issued for the **New Model Code**, click of **OK** button, to issue the selected tools for the **New Model Code**.

7.16.1 Status of tools in Model Close screen

If the tools that were used by the Model earlier are not issued to some other model and are in the **Usable** state in the *Tool master*, then its **Status** is displayed as **Used** in the list view.

If the tools that were used by the Model earlier are not issued to some other model and are in the **Reground** state in the *Tool Master*, then its **Status** is displayed as **Reground** in the list view.

If the tools that were used by the Model earlier are not issued to some other model and are in the **Non-Usable** state in the *Tool Master*, then its **Status** is displayed as **Non Usable** in the list view.

All tools other than the tools that were used by the Model earlier are displayed in the list view with their status as **Available**.

If the **Status** of the Tool is **Used**, **Reground** or **Non Usable**, then on selection of the **Tool** from the list view, the grid displays the values for the parameters on which the tool had operated for the Model. You can modify the value of the parameter(s), by checking the check box corresponding to the tool and then entering value in the grid for the parameter(s).

If the status of the tool is available then the Value column of the grid is empty. If you select a tool with **Status** as **Available**, then you have to enter the value for all the parameters for that tool.

8 Overview of Email and SMS Facility

Email/SMS Facility in PROQMS-XTRA

Email & SMS facility in ProQMS-Xtra gives the information about trends that are raised during inspection. All trends that are raised during certain interval of time, ProQMS-Xtra will send trend count through SMS and customized message through Email to configured users. Trend information is available on individual E-mail Id or Mobile No and also to send trend information which is pending for corrective action to Unit Manager, General Manager, and President.

.
If user right click the icon of E-mail & SMS system, Six options will be available i.e. **Start Email, Start SMS, Stop Email, Stop SMS, Configuration and Exit.**

During startup, 'Start Email, Start SMS' is enabled and 'Stop Email, Stop SMS' is disabled that means no any service like Email or SMS is running.

After click on 'Start Email', this option will get disabled & checked & Stop Email will get enabled & unchecked. E-mail system starts the working i.e. to search the trends for particular interval of time (i.e. time assigned in Configure Frequency master) that are assigned by the user & send configured trends with machine, station, part related information to assign mail id.

G_EmailSCL = True
When application will get start, system will show 4 menus like Start E-mail, Stop E-mail, Configuration and Exit.
When user click on Start E-mail, based on Email Frequency, system will gather the information for trend which are pending for corrective action and create pdf file for same and send the mail to relevant unit manager for a cell. At the same time based on unit manager/general manager frequency, system will gather the information for trend which are pending for corrective action and create pdf file for same and send the mail to relevant general manager/president. While sending a mail to general manager, system will also send the mail to unit manager of general manager. In a day, system will send one mail to general manager & president.

When email frequency get elapsed then system will gather the information for trend which are pending for corrective action and create pdf file for same and send the mail to relevant unit manager for a cell.
System will send the mail even if No trend for pending correction action available.
Before sending mail to General Manager or President, systems will checks for current date mail has been sent or Not.

SMTP is used for sending Email.

After click on 'Start SMS', this option will get disabled & checked & Stop SMS will get enabled & unchecked. SMS system start the working i.e. to search the trends for particular interval of time that are defined by the user & sends count of Trends to Mobile No that are defined in the database with respect to the Shift.

After Selecting Configuration menu from the tray-icon of Email/SMS and by entering valid user name & Password, following options are available.

File Configuration.

- Click on file -> Exit, form will get unloaded.

- Click on Configuration, following options are available.

Email_SMS_Contacts_User
Email_SMS_Configure_Frequency of SMS/Email
Email_SMS_Configure_WebUser of SMS
Email_SMS_Configure_SenderEmailID
Email_SMS_Configure_Shift-User
Email_SMS_Configure_User-Machine

8.1 Email_SMS_Contacts_User

Use this option to add/modify/delete Email User, Email Id, Mobile No, ShiftChgSMS, Category and Desktop Frequency for sending Trend related information via Email & SMS.

Click **Add** to add a new entry. Enter the following details:

Name – The name of the user.
Email Id – The Email Id of the user.

Select option to choose mobile category.
GSM
CDMA

User needs to select one of the mobile categories to enter the mobile number or to select 'Shift Change SMS'.

- **Mobile No** – Mobile number of the user.
- **Shift Change SMS** – This indicates "Shift Change SMS" (alert) for changing the shifts of the user in Email/SMS application.
- **Category** – Pre-defined category of the user. i.e. President, General Manager, Unit Manager and None
- **Desktop Frequency** - Frequency for sending Trend related information via Email.

Click Modify to modify details. Click Save to save a new record or modification. Click Cancel to cancel a modification or addition. Click Delete to delete a record. You cannot delete a user if it is used in the Configure Shift User Screen

8.2 Email_SMS_ Configure_Frequency of SMS/Email

Use this option to modify Email & SMS frequency, Shift Change day & time, Unit Manager Frequency, General Manager Frequency, and Pending Days for Non Conformity Frequency. This data will require during sending E-mail & SMS

Click **Modify** to modify the configure frequency for the following fields.

Email Frequency – Define Email frequency in minutes.
SMS Frequency – Define SMS frequency in minutes.
Shift Change day – Select the shift change day from the drop down list.
Shift Change Time – Enter shift change time.

User can specify **Unit Manager Frequency, General Manager Frequency, Pending Days For Nonconformity Frequency**. This will be used if the Unit Manager or General Manager has not taken the corrective action within specified frequency, email will be sent to GM or President.

Click **Modify** to modify details. Click **Save** to save modification. Click **Cancel** to cancel a modification. Click **Delete** to delete a record

8.3 Email_SMS_ Configure_ Web User of SMS

Use this option to add only one Web User, Password, and Sender ID for sending Trend related information via SMS. Product use the third party tool from snowwebs.com for sending SMS. For sending SMS Internet connection is required.

Click **Add** to add only one record. Enter the following details:

User Name – The User name
Password – User Password
GSM Sender Id – Enter GSM sender ID for GSM mobile category.
CDMA Sender Id - Enter CDMA sender ID for CDMA mobile category.

Click **Modify** to modify details. Click **Save** to save a record or modification. Click **Cancel** to cancel a modification or addition. Click Close button, Active form will get unloaded.

8.4 Email_SMS_ Configure_ Sender Email ID

Use this option to add only one User, Sender E-mail Id, Host Name and Port for sending trend related information via Email.

Click **Add** to add only one record. Enter the following details:
User Name – The User name
Sender Email Id – Email Id of the sender.
Password –Password of Email Id for whom mail will send
Host Name – The Host Name
Port – Port Number

Click **Modify** to modify details. Click **Save** to save a record or modification. Click **Cancel** to cancel a modification or addition. Click Close button, Active form will get unloaded.

8.5 Email_SMS_ Configure_ Shift User

Use this option to maintain a relation between shift and User.
User can add/modify/delete Shift, User. This data will require to distinguish shift wise user.

Click **Add** to add a new entry. Enter the following details:

Shift Code – Select the shift code from the drop down list.
Name – Select the User.

Click **Modify** to modify details. Click **Save** to save a new record or modification. Click **Cancel** to cancel a modification or addition. Click **Delete** to delete a record. You cannot delete a user if it is used in the Configure User Machine Screen

8.6 Email_SMS_ Configure_ User Machine

Use this option to maintain a relation between User and Machine.
User can add/modify/delete Machine and User. This data will require to allocate machine user wise.

Click **Add** to add a new entry. Enter the following details:

Name – User Name
Machine No. – Select the Machine Number

User can select the following options as per the requirement.

All Shift Report

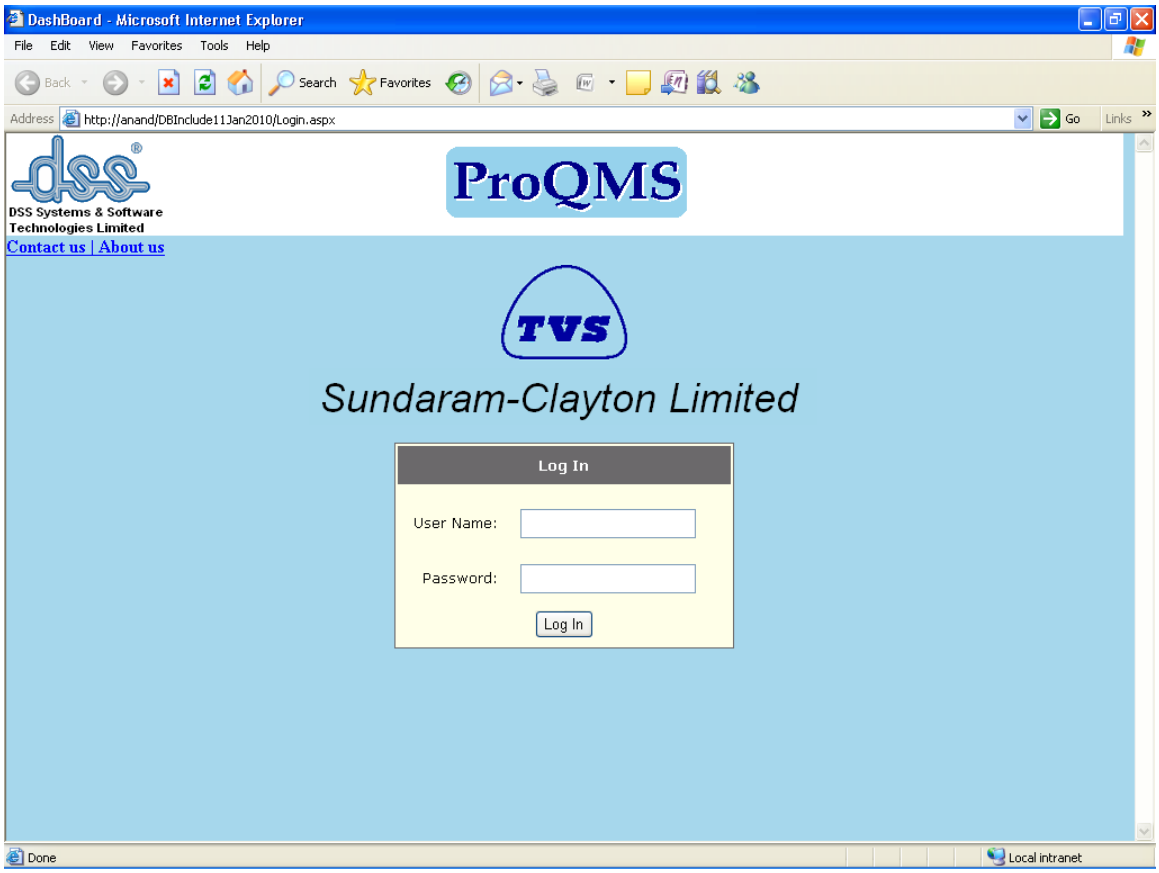
Shift Report
Regular E Mail
Regular SMS

Shift Report/All Shift Report display information of trend raised for a machine during the shift that cover Shift, Shift Time, Station No, Machine No, Machine Name, Part No, Part Name, Job No, Process Code, Process Name, Parameter Code, Trend Description, Sample No, Sample Date, Sample Time, Responsibility Assigned To, Target Date, Corrective Action taken Date, Corrective Action, Root Causes, Remark which is export from crystal report to Acrobat file (.pdf).

9 Overview of Dashboard

9.1 Log in

It will provide login detail of web-based dashboard. It prevents the unknown user to login in the Dashboard site.



Login screen should have **User Name** and **Password** with Login button.

- If User Name or password is wrong then user can see the message 'The username or password is incorrect. Please try again.'
- If user Name and password is correct and user has not assigned the dashboard level then user can see the message 'User has not defined the dashboard level'.
- If user is not active then user can see the message "User is not valid as active indicator is not checked in user screen"
- If user password is expired then user can see the message "Your password is expired. Contact System Administrator"

When user entered valid user name and password then display the screen of the dashboard level for the logged in user.

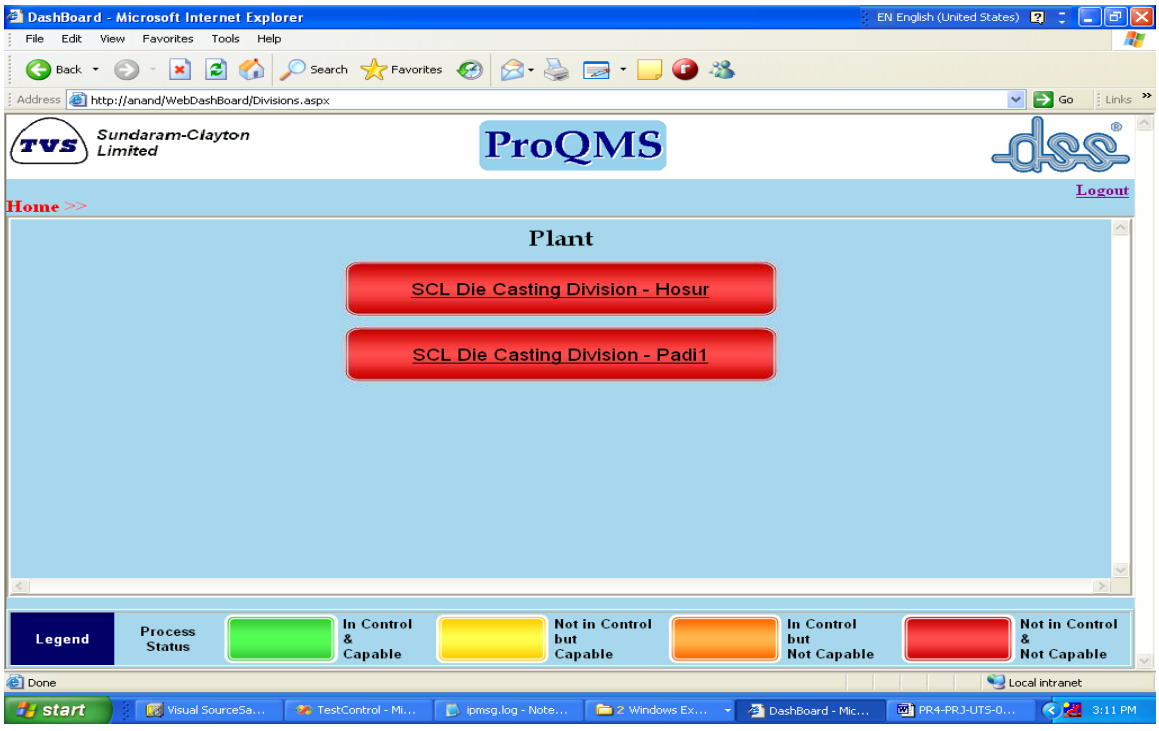
9.2 Dashboard Navigation

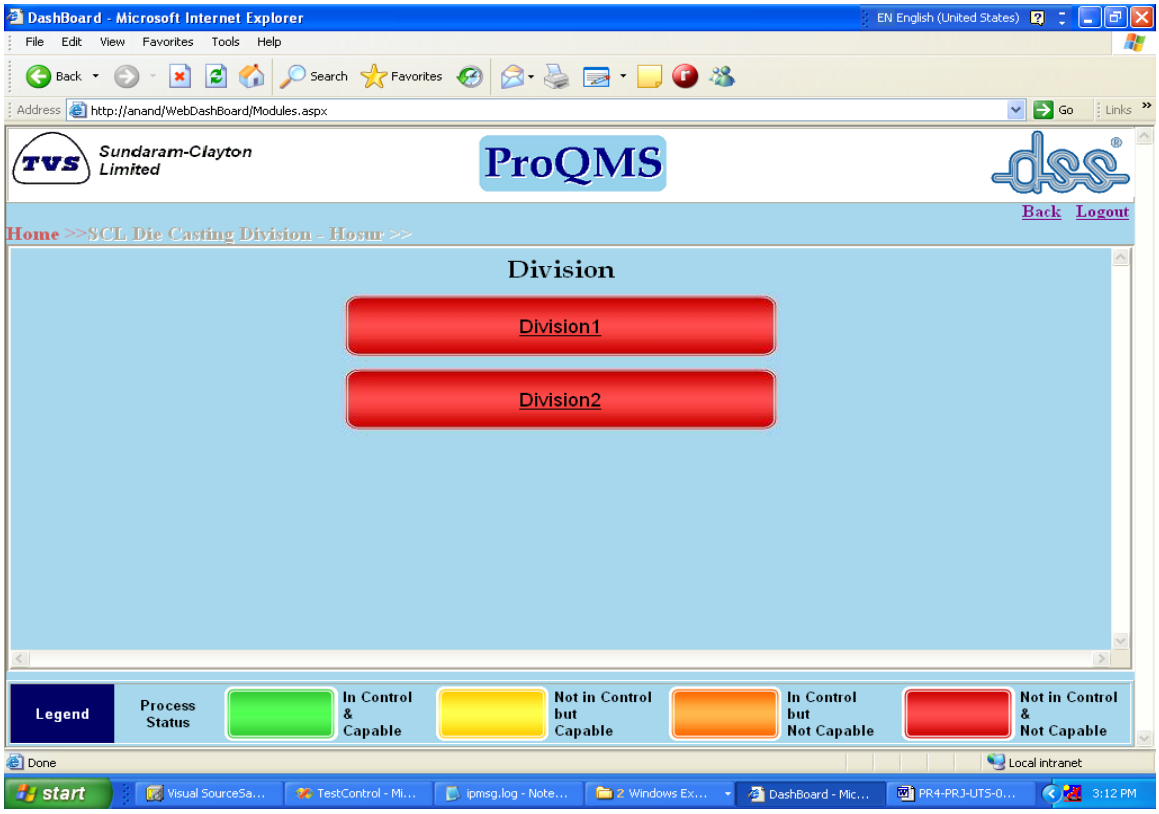
It provides dashboard navigation for Plant, Division, Unit, and Location/Cell page.

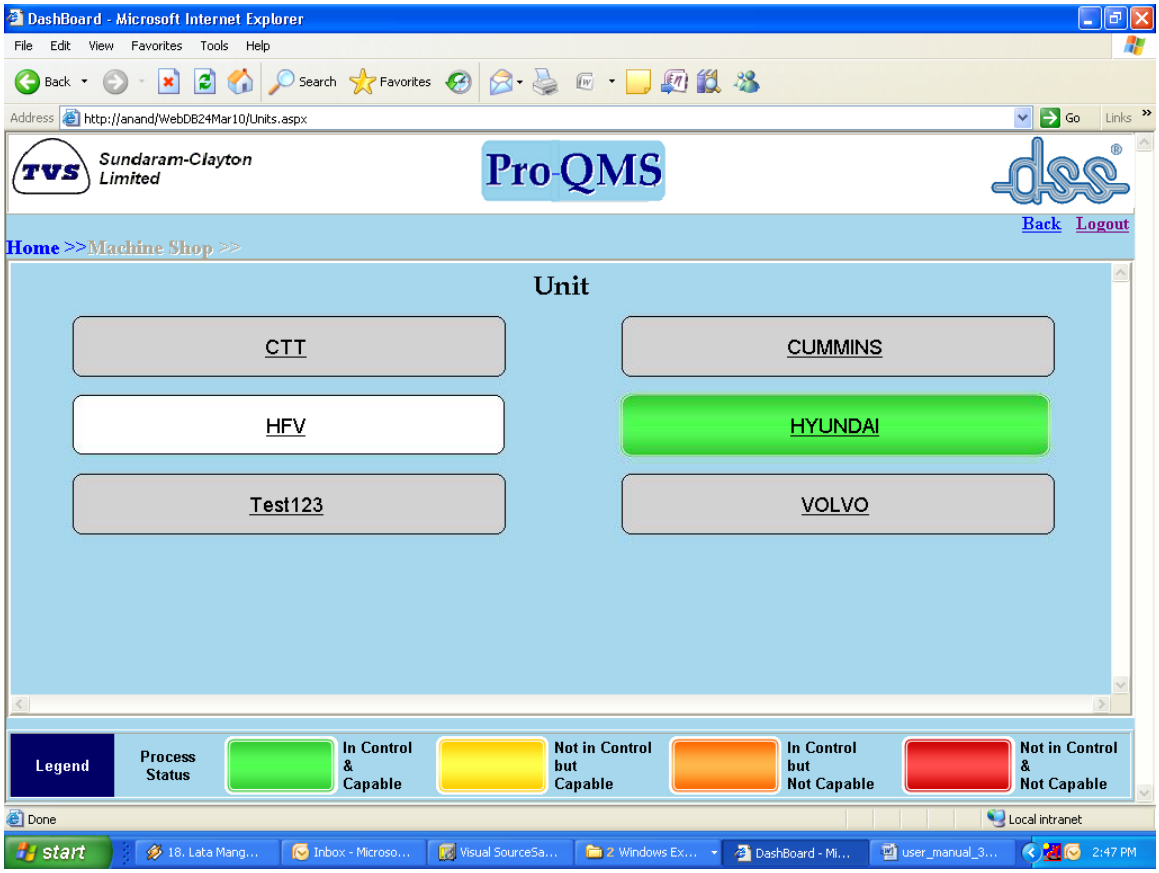
After the successful login user can see his dashboard on the page.
Color will be display as per the control limits and Cpk value.
Green - In control and Capable
Yellow - Not in Control but capable
Orange - In Control and Not Capable
Red - Not in Control and Not Capable

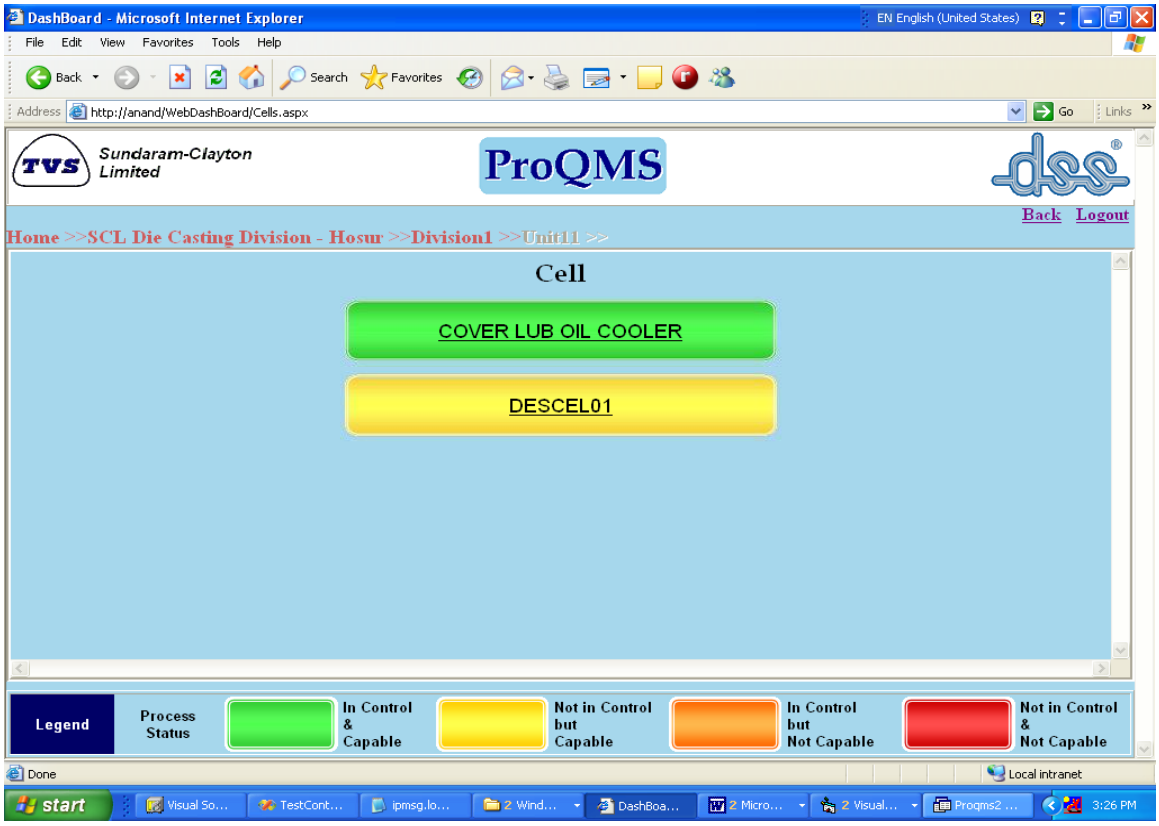
If user has assigned different locations from different Plants then user can see different Plants on the first screen. When user clicked on Plants then immediate user can see the Locations/Cells which are assigned for user.
When user click on Locations/Cells then user can see all the parameters i.e. all the jobs which are assigned for that locations.
i.e. Job No, Machine No, Part No, Parameter, Process Status, Cp and Cpk.

When user clicks on Process status column then Control Charts will be display in new window. i.e. Histogram, Statistical Analysis, X Bar R chart and readings in the grid.




DashBoard - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://anand/WebDashBoard/Modules.aspx
Go Links
Sundaram-Clayton Limited
ProQMS
Back Logout
Home >>SCL Die Casting Division - Hosur >>
Division
Division1
Division2
Legend
Process Status
In Control & Capable
Not in Control but Capable
In Control but Not Capable
Not in Control & Not Capable
Done
Local intranet
start
3:12 PM


DashBoard - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://anand/WebDB24Mar10/Units.aspx
Go Links
Sundaram-Clayton Limited
Pro-QMS
Back Logout
Home >>Machine Shop >>
Unit
CTT
CUMMINS
HFV
HYUNDAI
Test123
VOLVO
Legend
Process Status
In Control & Capable
Not in Control but Capable
In Control but Not Capable
Not in Control & Not Capable
Done
Local intranet
start
2:47 PM


DashBoard - Microsoft Internet Explorer
EN English (United States)
File Edit View Favorites Tools Help
Back Search Favorites
Address http://anand/WebDashBoard/Cells.aspx
Go Links
Sundaram-Clayton Limited
ProQMS
Back Logout
Home >>SCL Die Casting Division - Hosur >>Division1 >>Unit11 >>
Cell
COVER LUB OIL COOLER
DESCEL01
Legend
Process Status
In Control & Capable
Not in Control but Capable
In Control but Not Capable
Not in Control & Not Capable
Done
Local intranet
start
3:26 PM

- If one of the parameter is Red from selected location then color of the Cell/Location is Red and the Plants color will also Red. Priority of the color is Red, Orange, yellow and Green.
- If one of the Parameter is Red then color for the cell is Red.
- If one of the parameter is not red and one of the parameter is Orange then color for the cell is Orange.
- If one of the parameter is not red, not orange and one of the parameter is yellow then color for the cell is Yellow.
- If one of the parameter is not red, not orange, not yellow and color of all parameter is Green then color for the cell is Green.
- If one of the parameter is Red from one cell then that Cell's color will be Red. The Cell is under in which Unit/Division/Plant will have also color Red.

User is on Dashboard Page i.e. Cp/Cpk Page. User has gone to this page by selecting Plant, unit and cell then user can see the link button options at the top i.e. Home -> Plant Name -> Unit Name -> Cell Name.

Cell Name is disabled from link button options. Home -> Plant Name -> Unit Name are enabled and user can click those link buttons. So that user can go directly to the page by clicking link button option.

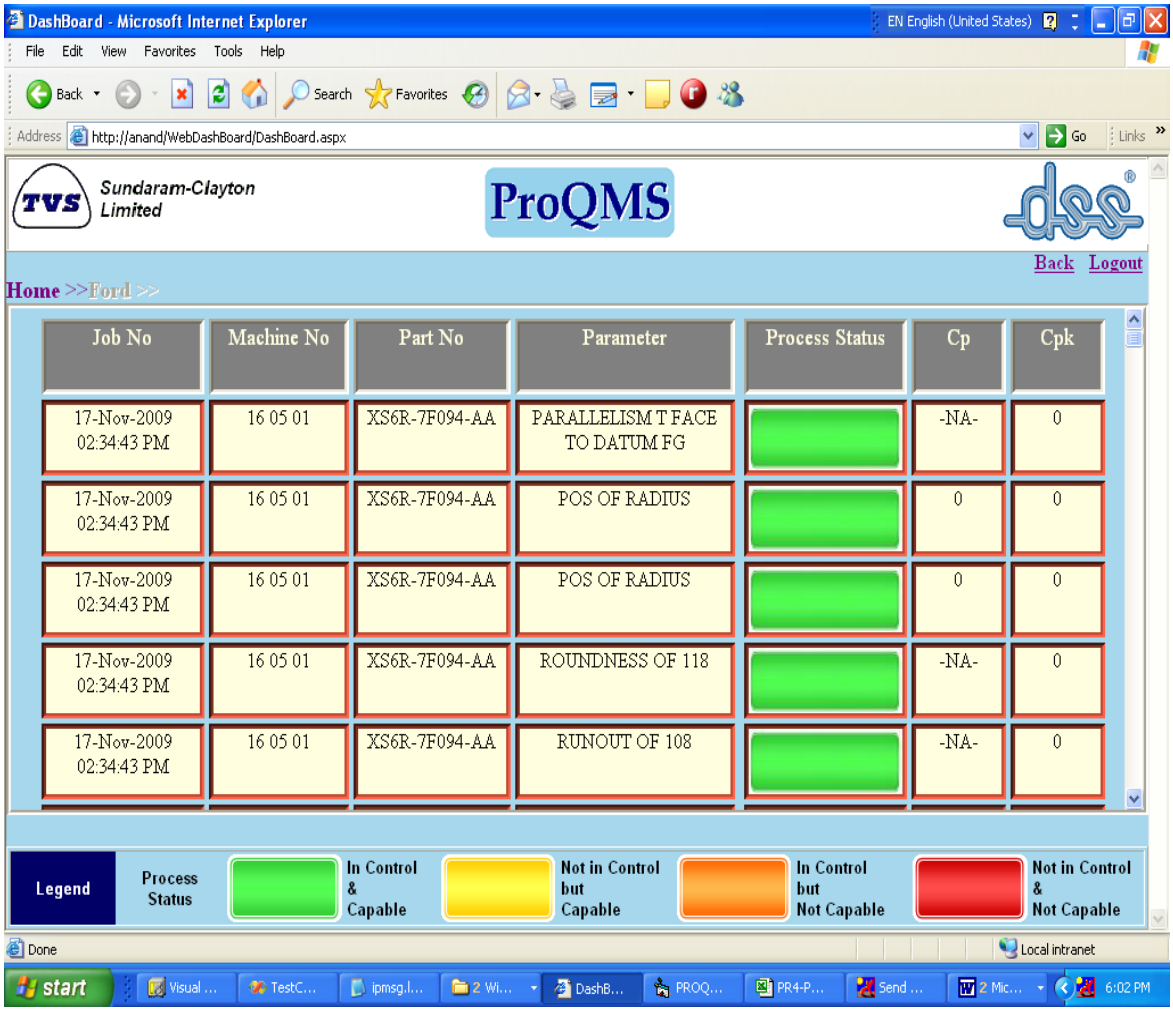
Running Line –
When user unselected the Running Line in Location Master then color of the cell button will be display as white.

Cp/Cpk based on QAP –
Process Status, Cp, Cpk and Pp, Ppk value will be calculated and display based on the Last Sample No configured in QAP. If user entered zero then these values will be calculated for all the samples.

Color coding of the process status of the parameter will not be considered when Line is not running and if data is not dumped for more than or equal to 1 day.

9.3 Dashboard Cp, Cpk Screen

It displays Job related parameters information for selected location/cell gets display.



This Page has Job No, Machine No., Part No, Parameter, Process Status, Cp and Cpk.

When Parameter is 100% inspection then display the value of Pp, Ppk.
When Parameter is sampling then display the value of Cp, Cpk.
When Parameters are only 100% inspection then display the header is Pp, Ppk.
When Parameters are Sampling and 100% Inspection then display the header is Cp, Cpk.

Process status will display the color depending upon the Control Limits and Cpk or Ppk value from XBarRSetting.
If Cpk or Ppk value is blank from XBarRSetting then Cpk or Ppk value will be considered as 1.66
In Control means - Xbar of sample is within control Limit
Not in Control - Xbar of sample is Out of control Limit

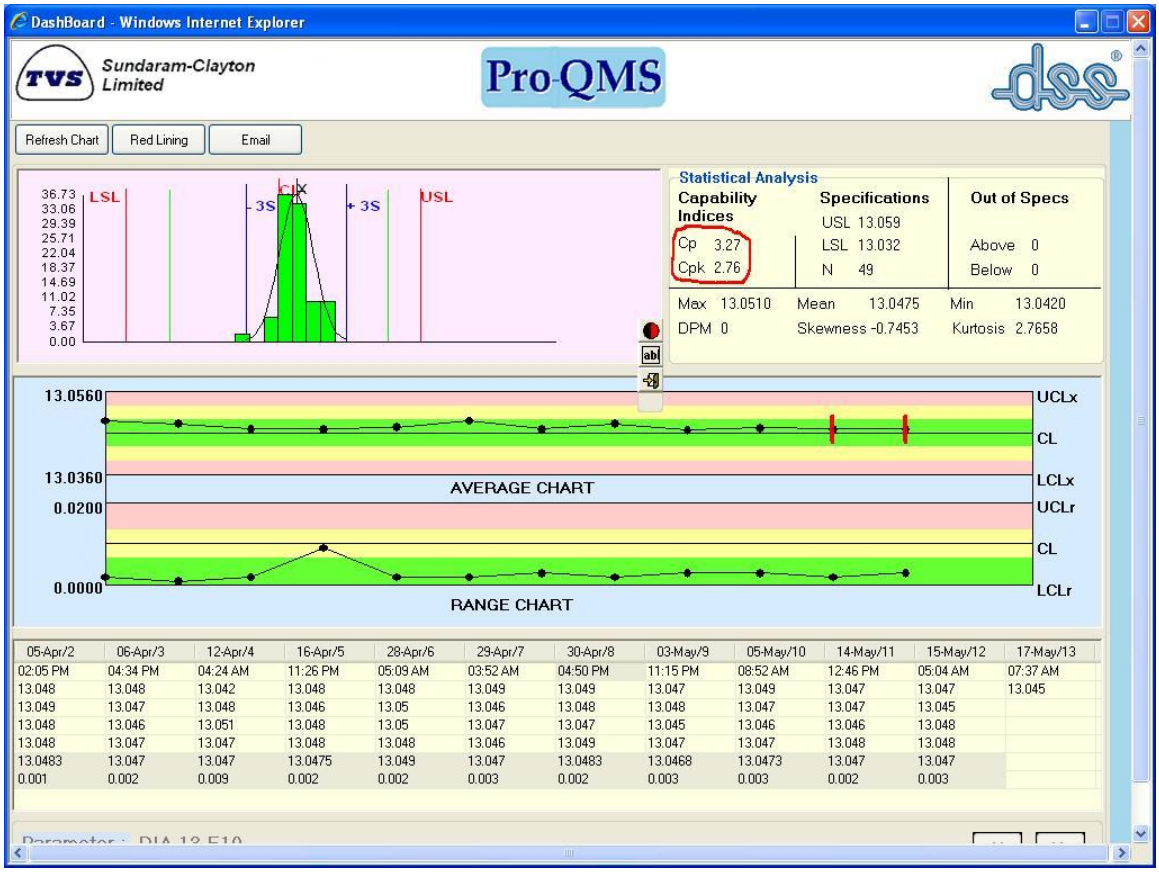
Capable - Cpk > 1.66
Not Capable - Cpk < 1.66
Process Status will have color Green when Process Status is In Control & Capable.
Process Status will have color Yellow when Process Status is Not In Control but Capable.
Process Status will have color Orange when Process Status is In Control & Not Capable.
Process Status will have color Red when Process Status is Not in Control & Not Capable.

Some samples has been taken and when user click on Process Status for that parameter then user can see the Control Charts in different page for the selected parameter.
Sample has not been taken and when user click on Process Status for that parameter then display the message 'No Reading taken'.
When reading has not taken for a particular parameter then the Process status will be disabling and display the default color i.e. other than Green, Yellow, Orange and Red.

If user configure 'Display Cpk or Ppk value' to zero (0) in Job Creation then Cp, Cpk or Pp, Ppk value will be calculated and display for all samples.
If user put the sample no 20 then system will calculate for last 20 samples.

9.4 Control Chart (OCX)

It provide details about the Control Chart ocx for the selected parameter from the Dashboard Cp,Cpk web Page. It displays Statistical analysis, Histogram, X Bar R chart and readings in the grid.



This page has Refresh button, Histogram, Statistical Analysis, XBarR Chart, Grid for displaying Readings and buttons for scrolling the readings from the grid. Parameter description can be seen at the bottom of the page.

User can see the different options of Charts by clicking left button of mouse on XBarR Chart. User can select any charts from those options.
If user selects X-chart then grid has two rows i.e. Time and X1 (Reading). If user selects XBarR Chart then grid display 7 rows if sample size is 4. i.e. Time,x1,x2,x3,x4,Average and Range. Header of the grid has Date/Sample number.
When user moves mouse pointer to a particular sample, user can see Sample No, X Bar, Date, Time and Readings. If Remark is present user can see that remark also. When user moves mouse pointer to a particular sample then first row will be selected from the grid of the selected sample.
If Remark is entered for the sample of the parameter then user can see the vertical line for that sample.

Statistical Analysis will display Capability Indices Cp, Cpk. Specifications USL, LSL, and N - Number of Readings
Out of Specs Above, Below. Max, Mean, Min, DPM, Skewness and Kurtosis.

When Pp, Ppk will be display then dpm will use the standard deviation by Square root method. When Cp, Cpk will be display then dpm will use the standard deviation by Rbar by d2 method.

Red Lining –
When user clicks on Red Lining button floating toolbar will get display, which contains 3 buttons 1.Marking 2.Add Comments and 3.Exit.

When user clicks on **'Marking'** Toolbar, user will be able to draw circle/line when user moves the mouse by pressing left button anywhere in the page to highlight the specified area.
When user clicks on **'Add** ' then text box will get display nearby where last red lining is done. User can increase/decrease the height or width of text box by moving Up-Down arrow or Left-Right arrow.
When use click on **'Exit'** button Red Lining Toolbar will get Invisible.

Email –

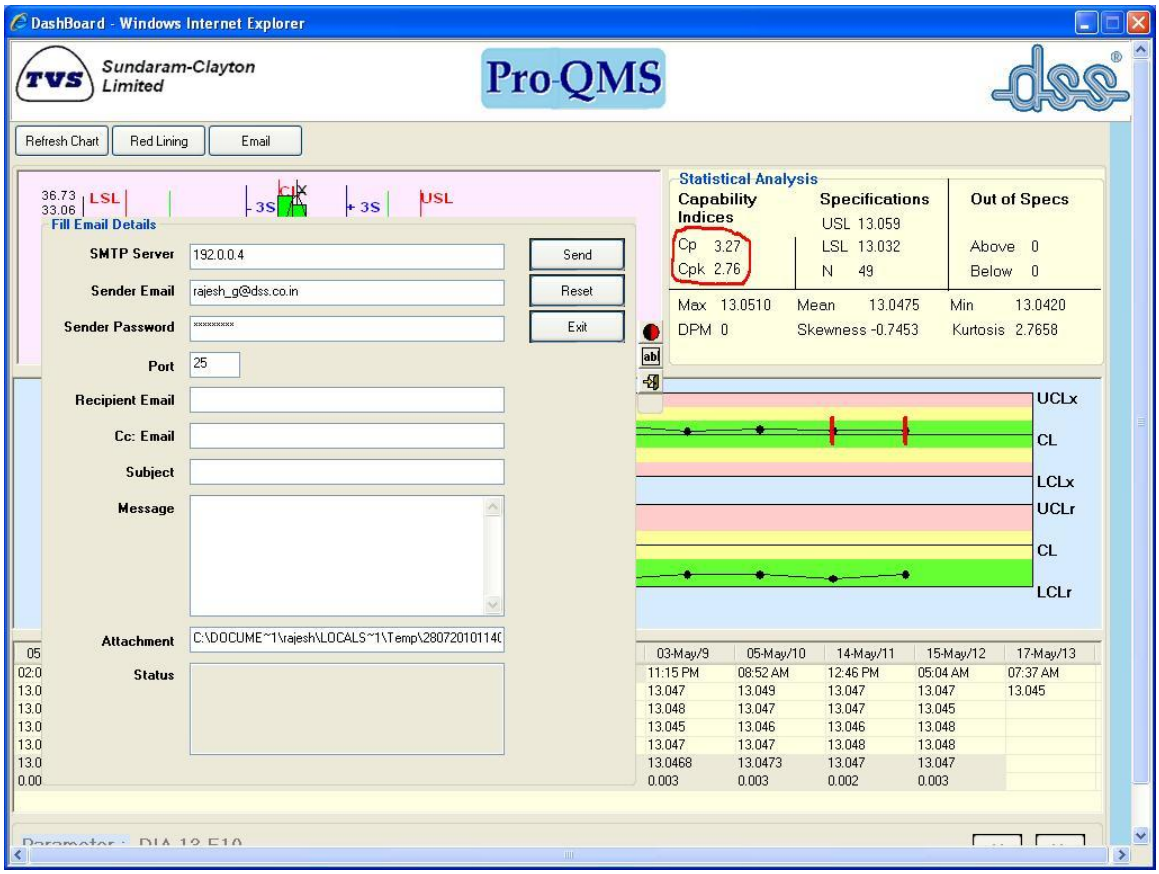
When user clicks on Email button, 'Fill Email Details' frame will get display which contains Send, Reset and Exit button.

In this frame, SMTP Server, Sender Email, Sender Password, Port will get populated based on the data inserted in Configure Sender EmailID screen of Email-SMS Project, this value user can change if required.

User has to enter Recipient Email, Cc: Email (Optional), Subject and Message. Attachment text box will show the current snapshot of .jpg image where system copied the snapshot of page. Status list box shows the processing of Email while sending the email. Just below Status list box system will show the message 'Message (Count) Messages sent in <No. of> sec'.

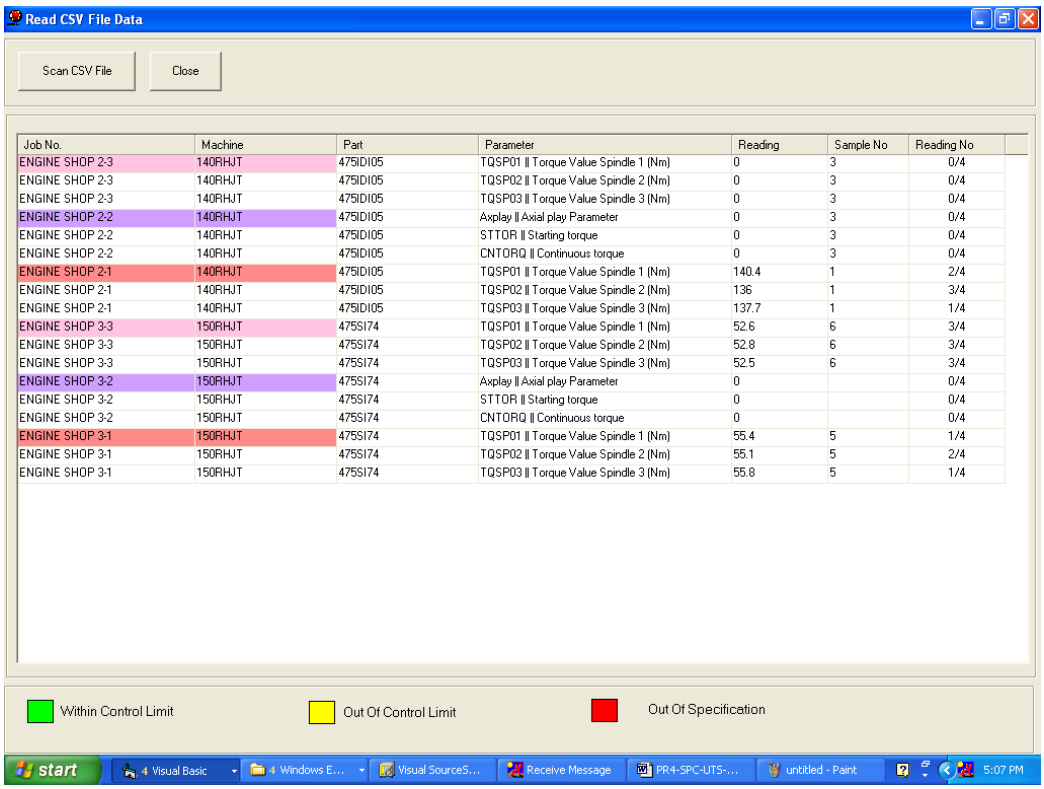
Reset button will clear the all contents in textbox, listbox that is below Port text box.

Exit button will exit from Email.



10 Data Collection

Through Data Collection application, Pro-QMS collects the data from .csv/. xls files, write the log file if data is not valid & move the files from original folder to History folder.



Data Collection screen will contain 2 buttons namely Scan CSV File, Close button and Grid, which contain 7 columns namely, Job. No, Machine, Part, Parameter, Reading, Sample No, Reading No. And bottom of screen contain legend of Within Control Limit, Out Of Control Limit and Out of Specification.
Close button will use for closing the application.

When user clicked on Scan CSV File button system will move all the files from Shared folder and move it to Process File folder. Once all files are moved to Process File folder then system sorts the file with ascending order of date and time. System reads a file one by one & dumps in respective cell as per the mapping sequence, which was defined in QAP and updates the Sample No, Reading No respectively.
Once file is scanned & data dumping has been done, system will move the file from Process Files folder to \HISTORYFILES \ PARTNO \ MONYY folder.

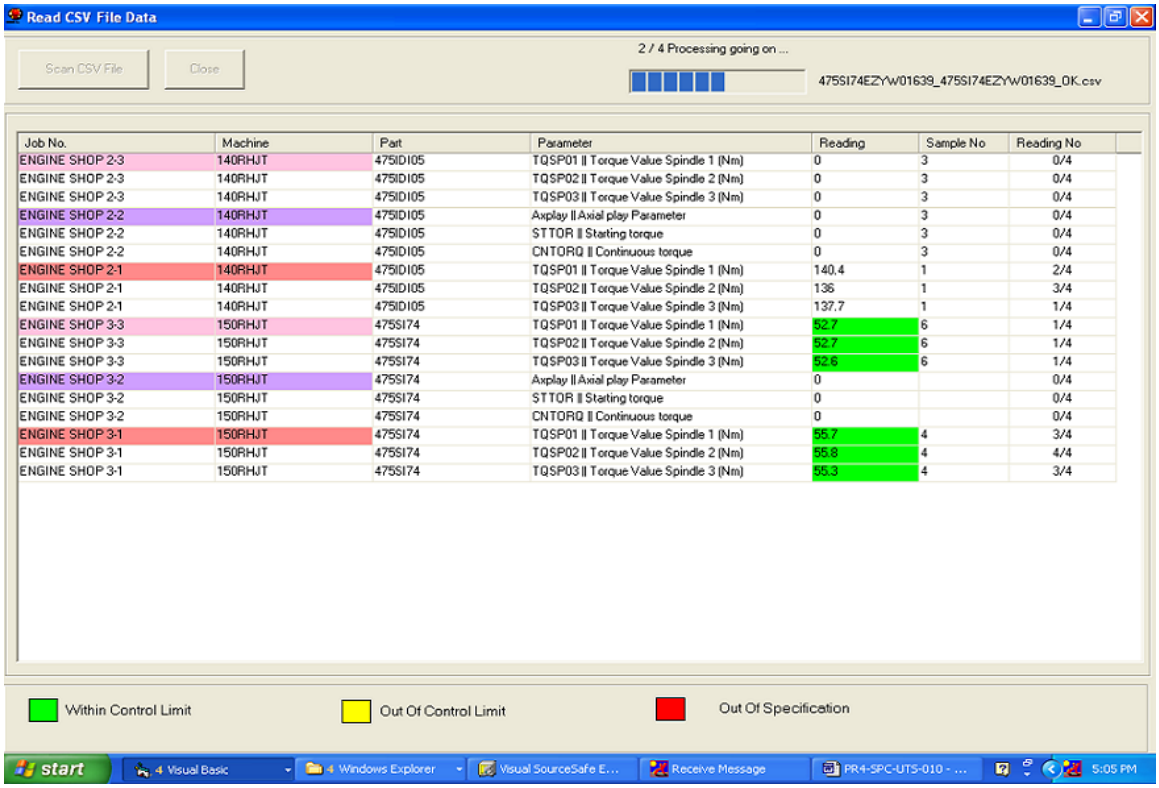
In case of Tata Motors Engine shop we also copy file in the ProQMSBackup\MMMYYYY of share folder path.

If job is not present for the part then system moves the file in \HISTORYFILES\Unscanned Folder. If data is not proper then puts in the current day Log file in the Log Files folder. If reading is not within the range of configure Percentage then system puts in the different table.

After scanning all files, system will write how much time is required for scanning and storing the files in the Process Time folder of that day.
Start time -
End Time -
Total Time -

Job No., Machine No row-column for start of every job show in 3 alternate color randomly.

While scanning a file, system will show File No/ Total No. of files (e.g. 2 / 13)
and progress bar along with File Name.



G_ExcelSCL = True

In case of SCL Data collection screen will contain 2 buttons namely Scan File, Close button and Grid, which contain 7 columns namely, Job. No, Machine, Part, Parameter, Reading, Sample No, Reading No. And bottom of screen contain legend of Within

Control Limit, Out Of Control Limit, Out of Specification. Just below the grid, Tab control will display number of tab which will depending upon the share folder name selected from the share folder screen. Each Tab contains a grid, which will contain 3 columns, namely All File, Scan File, and Unscan File.

Close button will use for closing the application.

When user clicks on Scan File button system will move all the files from Shared folder and move it to Process File folder. Once all files are moved to Process File folder then system sorts the file with ascending order of date and time. System reads a file one by one, extract the Part No from predefined cell, load all jobs for selected part no & station no. Stores the data as per the mapping sequence number and after reading completes system clears the grid & then read next file. If user selects two folder from Shared folder selection screen, once scanning for 1st folder start, then system will set the focus on 1st tab of grid and show files one by one in 'All File' column, once file scanned without any problem system will show same file in 'Scan File' column otherwise in 'Unscan File' column and simultaneously data will dumps in respective cell as per the mapping sequence, which was defined in QAP and updates the Sample No, Reading No respectively.

Once file is scanned & data dumping has been done, system will move the file from Process Files folder to \HISTORYFILES \Shared FOLDERNAME \PARTNO \ MONYYYY folder. E.g. – Application Path \SCLExcelFiles\HistoryFiles\CMM1\12236-RNA-A000\ Dec2010

If job is not present for the part then system will not load the job in a grid & moves the file in \HISTORYFILES \UNSCANNED \Shared FOLDERNAME \MONYYYY Folder and write the log file for current date in same folder by mentioning the Reason PartNo & file name.
If Part No is blank then system will not load the job in a grid & moves the file in \HISTORYFILES \UNSCANNED \FOLDERNAME \MONYY Folder and write the log file for current date in same folder by mentioning the Reason & file name.
If data is not proper then puts in the current day Log file in the Log Files folder. If reading is not within the range of configure Percentage then system puts in the different table.

After scanning all files from CMM1 folder, system will write how much time is required for scanning and storing the files of CMM1 folder. Following contents will be written in the log file of that day i.e. ddmmYYYY.
CMM1 Start Time: 12/24/2010 6:31:24 PM
End Time: 12/24/2010 6:31:26 PM
Total Time: 2 sec

Part Selection –

In case of Tata Motors User launch the CSV Data Application then system will show a grid with two column namely Part & Select and OK & Cancel button.
Part column will get populate which is based on Job Created for selected station.
Select all option will provide to select all the Part or User can select the Part by click on Select check box.
When user selects part then Ok button will get enabled.
On click of OK button, system will launch Data Collection for all jobs of the selected Part.
On click of Cancel button, system will unload the application.

In case of SCL User launch the Data collection Application then system will show a grid with two columns namely Shared Folder Path and Select & OK & Cancel button.
Share Folder Path column will get populates based on Share Folder Path screen.
Select all option will provide to select all the Shared Folder Path or User can select the Share Folder Path by click on Select check box. Systems will allow to selects the share folder paths, which have CMM1 or CMM2 folder name.
When user checks Shared Folder Path from Select column then Ok button will get enabled.
On click of OK button, system will launch Data Collection screen.
On click of Cancel button, system will unload the application.

G_HeatTreatment = True

When user has started the application, system will launch data collection screen with all created jobs in a grid. Grid have 7 columns namely Job No, Machine No, Part, Parameter-Description, Reading, Sample No, Reading No. Screen has 2 buttons namely Scan File, Close and one progress bar which show status of Parameter No/Parameter Count & parameter name and one text field for entering default hrs which is used for taking reading time (E.g. Current Time + Request time – Default Hrs (Request time *2) = Reading Time)

When user clicks on ‘Scan File’ button, based on last reading date-time and request time, system will send server name, archive path, start date, start time, end date, end time, average type and PartParaCode to PlantScape dll for getting data. Once get the data, system will dump for selected parameter by incrementing the sample no, reading no. Once data dumping for selected parameter is over, system will read data for next parameter and so in that way cycle will get proceeded.

E.g.

Request Time – 30 Min, Average Type – 1 Min, Last Reading Time – 06.00 PM

So at 06.30 PM systems will send the required parameter as SERVERNAME, ARCHIVEPATH, 12/05/2011,06.00 PM, 12/05/2011, 06.30 PM, 6 (Average Type), PARA1 to Plantscape.dll to get required data in an array.

While dumping the data from an array, system will checks data is numeric or not if it is invalid then system will write in the log file for same & will not be dumped the data and move to next reading in an array.

While dumping the reading, users can stop the data by pressing Esc key. When user presses Esc key, system will prompt the user 'Do you want to stop the data dumping?' with Yes/No button if user presses Yes then system will stop the data collection otherwise continue the data dumping.

After dumping last reading for a parameter, JobParameter table will get updated with LastAccessDate. E.g. If user closed the data collection screen then next time data collection will start for a parameter which have blank record in a field.

E.g. Below one example demonstrates how system will work.
(Request Time - 30 Min, Average Type - 1 Min, Current Time - 10.00 AM
Display minutes to be reduced from current time - 60
Read data reduced from current time In Min – 0)

Sr. No	Start Time	End Time	DumpingFinish	LastTime
1	09.30 AM	10.00 AM	10.10 AM	10.00 AM
2	10.00 AM	10.30 AM	10.35 AM	10.30 AM
3	10.30 AM	11.00 AM	11.35 AM	11.00 AM
4	11.00 AM	11.30 AM	11.45 AM	11.30 AM

In case of Sr. No 1, Reading time will be 09:01 AM, 09:02 AM, and 09:03 AM i.e. Start time + Request Time + 1.

User has closed the data collection. User has started the data collection screen and click on Scan file, Data is already dumped for the requested period, System will display the message on screen as 'Data already dumped, next request time is 13-Jun-2011 06:26:00 PM'

System will dump the data day wise i.e in a scenario when Start Time is 11:45 PM and End Time is 12:15 AM for Request Time is 30 Min, system will dump the data in 2 slab i.e 1st slab start from 11:45 PM to 11:59 PM and 2nd slab start from 12:00 AM to 12:15 AM and also user has not dumped the data for last 8-10 day then system will dumped the data day by day to 1st parameter and so on.

Suppose Average Type is 1 Min and Request period is 30 Min and if the Plants cape server sends the data of 20 readings instead of 30 readings then system should store the data from 10.00 to 10.30 but in this case from server data received is of 20 readings so system will store the data from 10.10 to 10.30 instead of 10.00 to 10.20. It will put in the log file data is not stored from 10.00 to 10.10 as less data is received from server.

For selected period, Plant scape server is unable to give the data then system will flash the message on label 'Server is not responding' and it will blink continuously till Plant scape server will give the data and write the log file for same in Application Path\HeatTreatment\ServerLog\11-Jul-11.txt

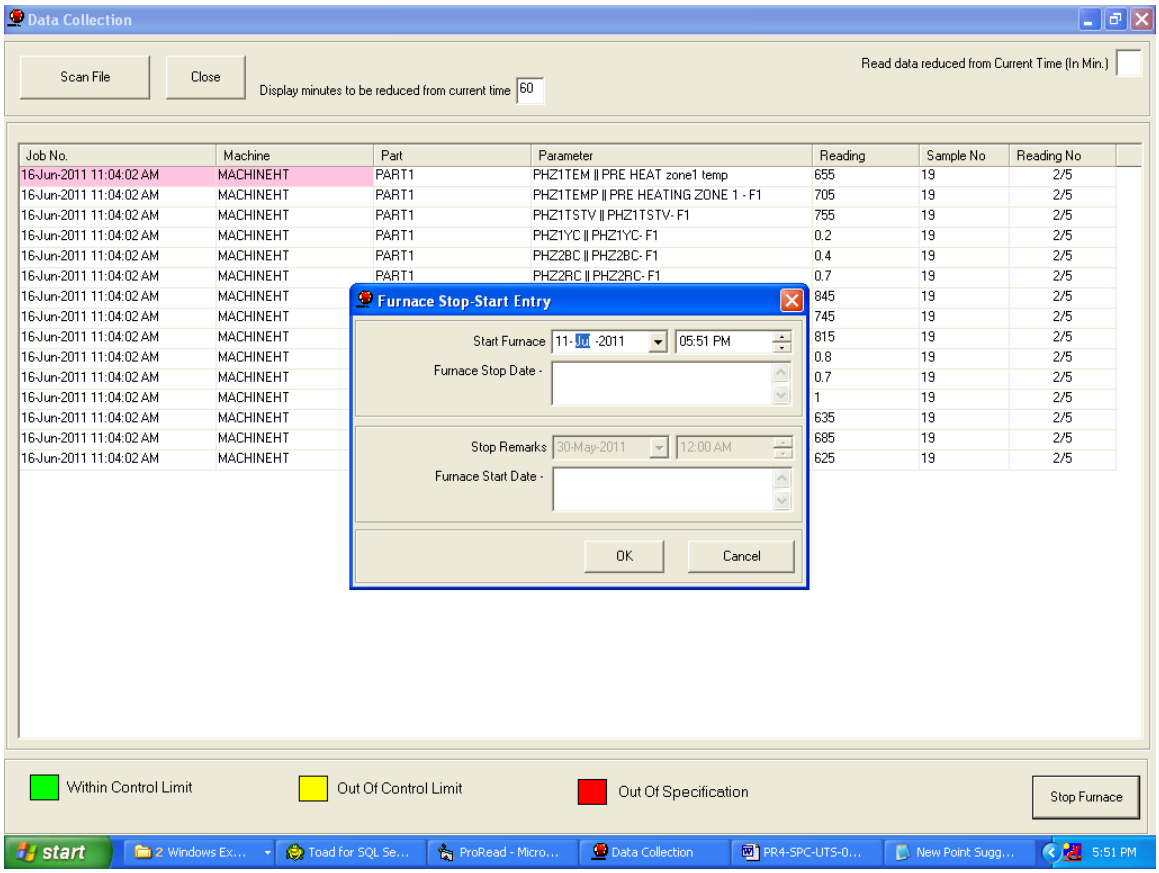
Furnace Stop/Start – When furnace gets stopped then user has to stopped the data dumping otherwise Out of Specs data will get dumped, for that reason system has provided the facility to stop & start the furnace. ('Stop Furnace'/ 'Start Furnace')

When user clicks on ‘Stop Furnace’ button then system will show new screen to enter Furnace Stop Date, Time and Stop Remarks. Once user has stopped the furnace, label of ‘Stop Furnace’ change to ‘Start Furnace’ then without start of furnace user cannot dump the data. Stop Furnace Date-Time should be greater than Last Access Date.

When user click on ‘Start Furnace’ button then user has to enter Furnace Start Date, Time, Start Remarks then label of ‘Start Furnace’ change to ‘Stop Furnace’.
Start Furnace Date-Time should be greater than last ‘Stop Furnace Date-Time.

When user has dumped the data for few parameters and click on ‘Stop Furnace’ button then system will prompt the message ‘Furnace stop is valid only when user has dumped the data for all parameters’ and then operation will get cancelled.

Furnace Stop-Start Entry



11 Desk Top Alert

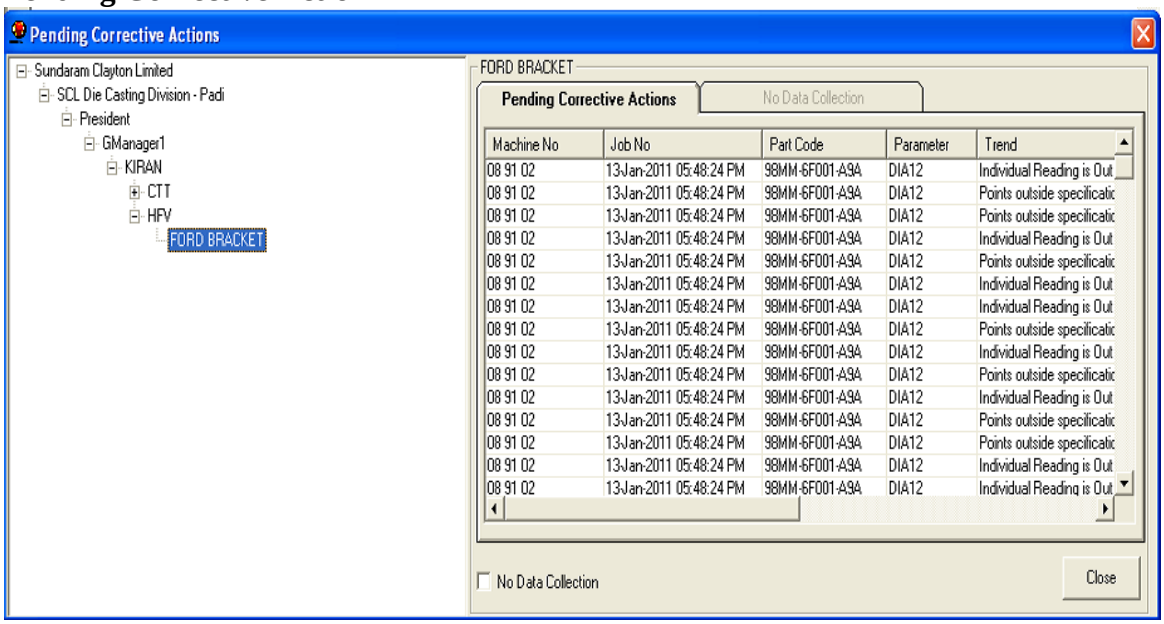
Desk top alert facility displays pending corrective action list cell wise for windows user category. On mouse move of tray icon, system will show 'Desktop Alert'.
Tray Icon for Desktop Alert screen has three buttons namely Start Desktop Alert, Stop Desktop Alert and Exit.

If windows login user has category President/General Manager/Unit Manager (P/G/U) which was defined in Email application of Contact/User screen and is available in Email Escalation Master screen then system will launch the Pending Corrective Action screen and Desktop Alert screen show disable 'Start Desktop Alert', enable 'Stop Desktop Alert' and 'Exit' menu button.
If user clicks on 'Stop Desktop Alert' button then system will close Pending Corrective Action screen, disables 'Stop Desktop Alert' button/menu and enable 'Start Desktop Alert' button.
If user clicks on 'Start Desktop Alert' button then system will show Pending Corrective Action screen, disables 'Start Desktop Alert' button/menu and enable 'Stop Desktop Alert' menu.

Pending Corrective Action screen will get launch depending upon the desktop frequency defined for the user, on left hand side system will show a tree view structure for selected windows user i.e. President, General Manager, Unit Manager, Unit, Cell/Location and on right hand side system will show a 2 tab namely Pending Corrective Action and No Data Collection. No Data Collection checkbox will be used for selection of No Data Collection tab.

If Window User has category President/General Manager/Unit Manager (P/G/U) and is not available in Email Escalation Master then system will prompt the message and enable 'Start Desktop Alert', disable 'Stop Desktop Alert' menu.

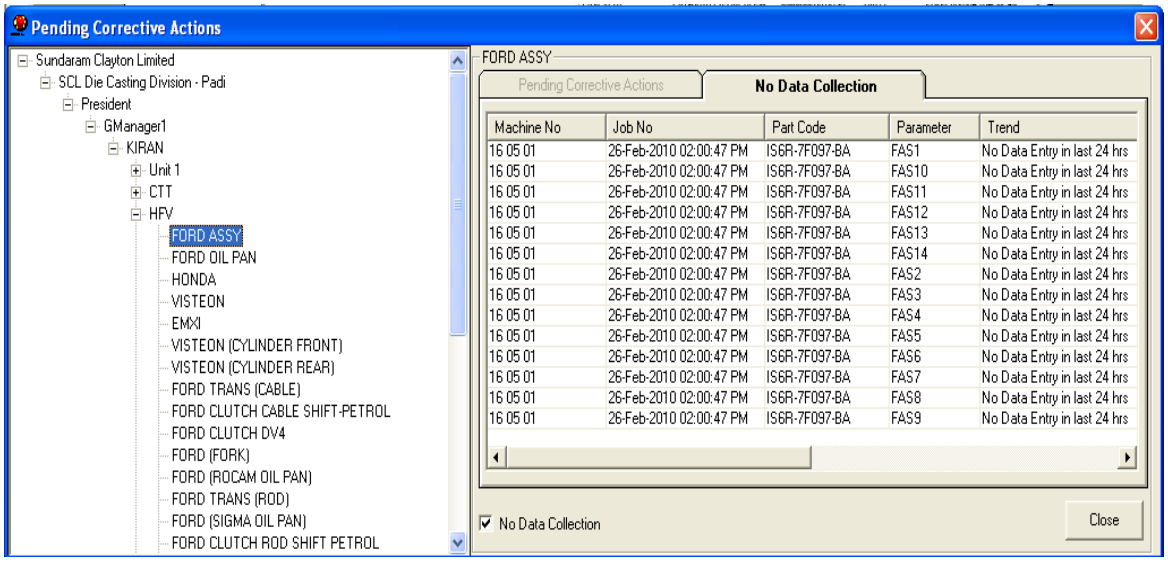
Pending Corrective Action



First tab contains grid, which populate the trend of 1 to 28 which are configured for selected cell and second tab contain grid, which populate the trend of 29-30 for selected cell. By default 'No Data Collection' checkbox is unchecked and 2nd Tab will be disabled.
When user unchecked 'No Data Collection' then 1st tab will get enabled and 2nd Tab will get disabled and when user checked 'No Data Collection' then 1st tab will get disabled and 2nd Tab will get enabled.
No Data Collection Tab grid contains 2 trends like Line not running and No Data Collection in last 24 hrs.

Grid contain 9 column namely Machine No, Job No, Part Code, Parameter, Trend, Sample No, Sample Date, Sample Time, Station No. Grid is not editable.
Tree structure & grid will populate based on user Category and frequency of unit Manager, General Manager and Pending days for Nonconformity, which was defined in the Frequency of Email/SMC screen

No Data Collection



Based on Desktop Frequency, system will refresh the grid along with tree to show the latest record.

Unit Manager can see all records of Pending nonconformity corrective action of defined Units.

General Manager can see records of Pending nonconformity corrective action from (Current day/time – Unit Manager Frequency-Non Conformity Pending day-12 Hrs) to (Current time/day – Unit Manager Frequency-12 Hrs) of which are defined for different units.

President can see records of Pending nonconformity corrective action from (Current day/time – General Manager Frequency-Non Conformity Pending day-12 Hrs) to (Current time/day – General Manager Frequency-12 Hrs) of which are defined for different General Manager and units.

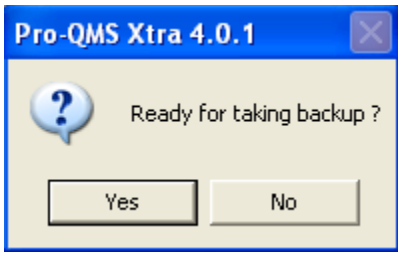
Under Unit node user can see different Cell. Cell has different Machine. When user selects Cell, system will show pending corrective action machine wise in that cell.

Hierarchy will be President -> General Manager -> Unit Manager -> Cell.

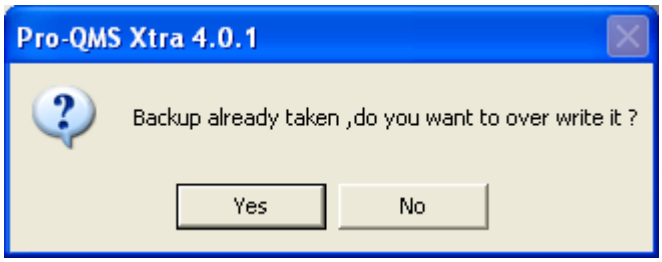
12 Special Features

12.1 Backup

It is very important to take a backup of the database at regular intervals. This ensures that no data is lost in the event of any unforeseen circumstances like machine failures, disk crashes, database crashes etc. The **Backup** option makes a copy of database that can be used in future.
The last three backups taken will be maintained by the system.
Select **File/Backup** from the Main Menu. The screen below is displayed.



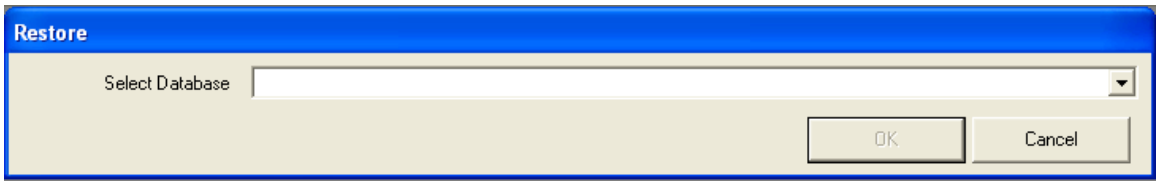
On confirmation, the message "Backup process in progress…" is displayed.
On completion the message "Backup completed successfully" is displayed.
A copy of the database is made in the Backup directory. The name of the Backup database will be the current date appended to the database name e.g. *ProQMS-Xtra2-27-May-2003.*
For **Access** Database : The database name will have the extension *.mdb*
For **Oracle** Database : The database name will have the extension *.dmp*. The logfile will also be created in the same directory with the same database name and extension *.log*. You can view the contents of the logfile to check the status of the backup process.
For **SQL Server** Database: Backup will be taken on the server in a backup device. The name of this device will be the current date appended to the database name. This will be created on the server machine itself. You can view the device from the Enterprise manager on the server. This file can be transferred to Detachable storage devices manually. For every backup a new device will be created.
If you attempt to take a backup on the same date more than once, the following question is displayed.



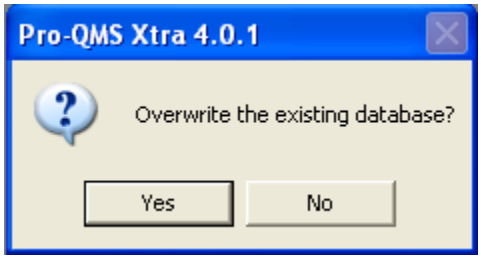
Click **Yes** to overwrite the backed up database. Clicking on **No** displays the message "Backup canceled".

12.2 Restore

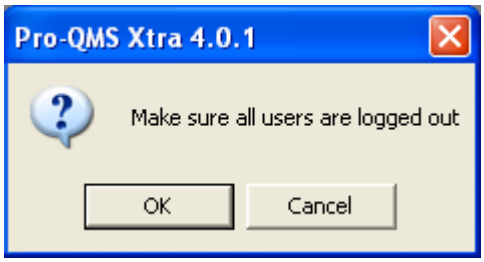
The **Restore** option is used to restore data from the backup database when the need arises. Select **File/Restore** from the Main Menu. If a backup database does not exist, the message "No files found in backup directory" is displayed.
When backups exist in the backup directory, the screen below is displayed.



Select the database name from the drop down list which is displayed from the Backup directory.
For **Access** Database : The databases with the extension *.mdb* will be displayed.
For **Oracle** Database : The database names with the extension *.dmp* will be displayed.
For **SQL Server** Database: All devices on which backups are taken will be shown in the list. For any selected device restore will be carried out. Before restore, the original device file should be on the same location from where it was taken. If the device files are copied to storage devices and deleted from the hard drives, they should first be restored to the hard drives and then Restore should be carried out.
After the database is selected, the following question is displayed.



On confirmation, the following message is displayed.

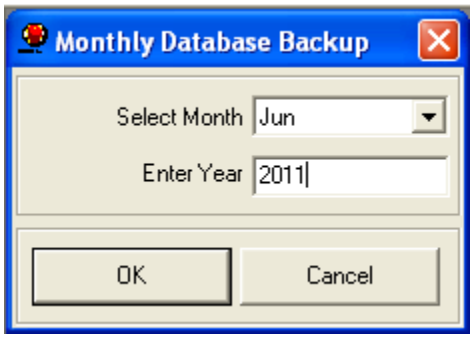


After you have ensured that all users have logged out, click **OK** to proceed.
On completion of the restoration process, the message "Restore process completed" is displayed.
The existing database will have been overwritten by the selected database.

12.3 Monthly Database Backup

The **Monthly Database Backup** option is used to create the database of name Month Year (mmYY) and constraint, stored procedure and will copy data of configured master and transaction to newly created database and create System DSN for same

Select **File/ Monthly Database Backup** from the Main Menu. The screen below is displayed.



User has to select the month from Month combo box and enter year in Year textbox and click on OK button, First of all system will check TableName.txt, DatabaseScript.sql, StoreProcedureScript.sql is present or Not.
If one of 3 files doesn't exist then system will prompt the message and write the log file for which doesn't exists and stop the database backup.
If all 3 files exist then system will check selected database is present at current database server.

If database is not present then system will create the database of entered Month Year, add tables, constraints, stored procedures, copied configured table from current database to newly created database and at last system will create system DSN for newly created database.
While copying the table record, system will check configure table is present in current as well as in newly created database, if not then system will write the log file for same and at last system will prompt the user 'Please check log file MMMYY.log' otherwise prompt the user 'Database created successfully'.

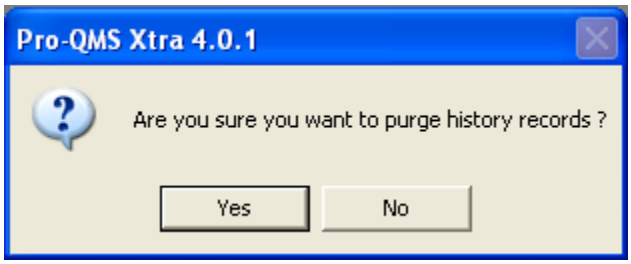
If database is present then system will flash the message 'Database Already Present'.

When user clicks on Cancel button or Close (X) button of screen then system will unload Monthly Database Backup Screen.

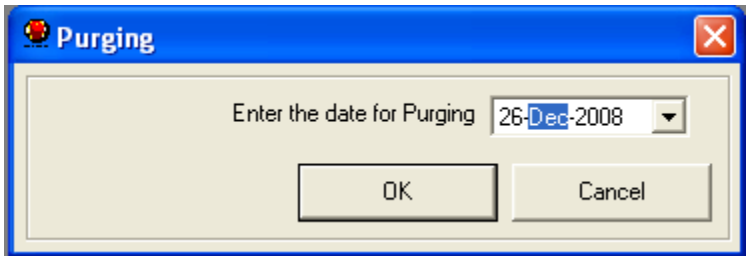
System has facility to take backups for last 3 month only.

12.4 Purging

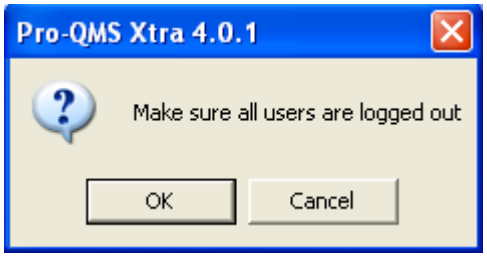
Over a period of time, there may be a lot of data accumulated in the database which is not used on a regular basis. This may relate to data pertaining to closed work orders, work orders completed during the previous years etc. The **Purging** option is used to move data out of the currently used database into a history database. This database will contain history records for closed work orders.
Before Purging, make sure all users have logged out and Backup has been taken of the database. Please note that the intermediate tables used during Purging must be empty before you start the Purging process.
Select **File/Purging** from the Main Menu. The screen below is displayed.



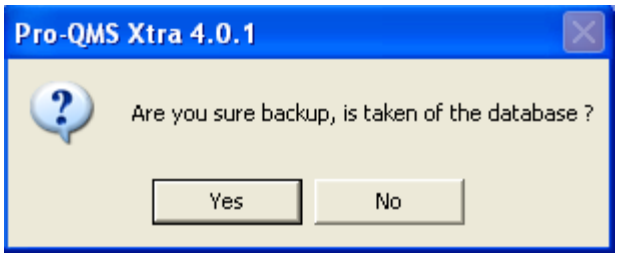
On confirmation, the following screen is displayed.



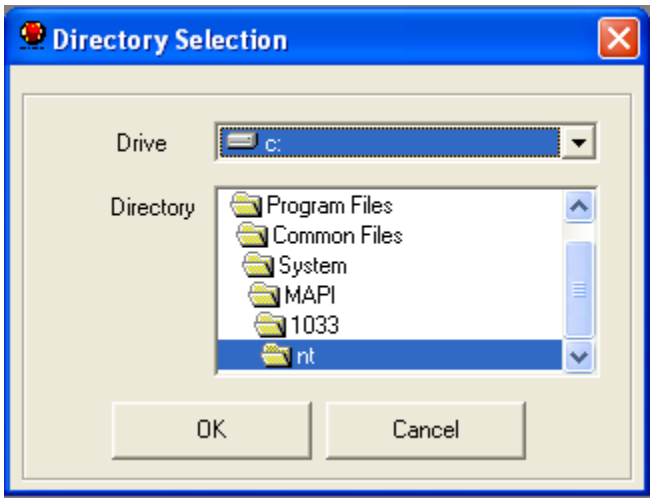
On entering the required date, the following message is displayed.



Click **OK** after ensuring that all users are logged out. The following question is displayed.



On confirmation, the directory selection screen is displayed.



Select the required directory where the purged records will be stored.
On completion of the Purging process the message "Purging is completed." is displayed.
The name of the History database will be the current date appended to "*ProQMS-XtraPurging"* e.g. *ProQMS-XtraPurging27-5-2003*.
For **Access** Database : The database will have the extension *.mdb*.
For **Oracle** Database : The database will have the extension *.dmp*.
For **SQL Server** Database: Purging will be taken on the server in a backup device. The name of this device will be created will be the current date appended to the database name. This will be created on the server machine itself. You can view the device from the Enterprise manager on server. This file can be transferred to Detachable storage devices manually. For every purged database a new device will be created.

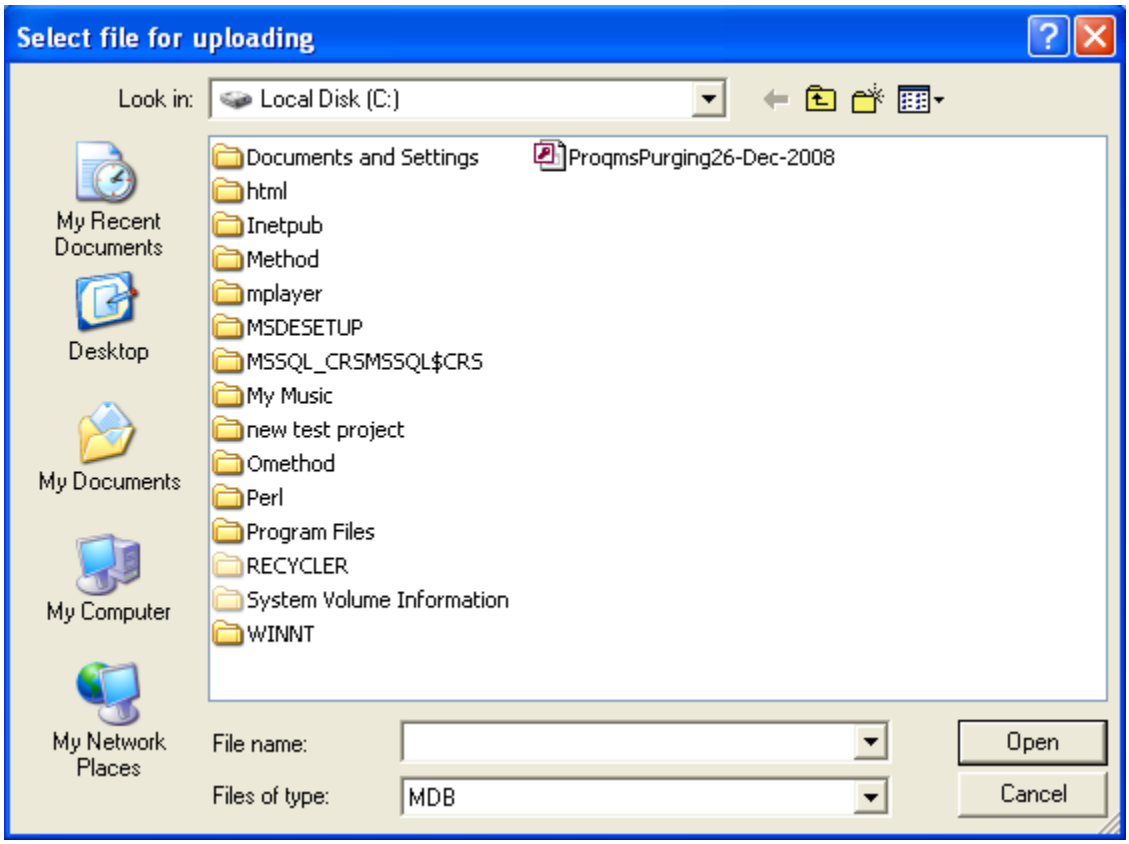
Steps In Purging

1. Data to be purged is transferred to intermediate tables within the database.
2. The new history database is created having tables of the same structure as the intermediate tables.
3. Data is transferred to the history database.
4. Data is deleted from the actual tables and intermediate tables.

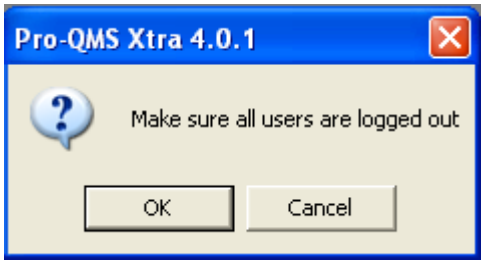
If at any stage during the Purging process, an error is encountered, the database is maintained at the state in which it was before the process began.

12.5 Uploading

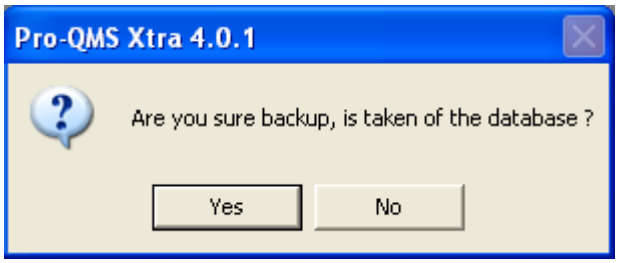
Uploading is used to reload data which has been transferred to history tables using the **Purging** option. If for some reason, data pertaining to closed work orders is required in the existing database, it can be done using **Uploading**.
Before Uploading, make sure all users have logged out and Backup has been taken of the database.
Select **File/Uploading** from the Main Menu. The following screen is displayed for selection of the database from which data has to be uploaded (i.e. *Purged* database).



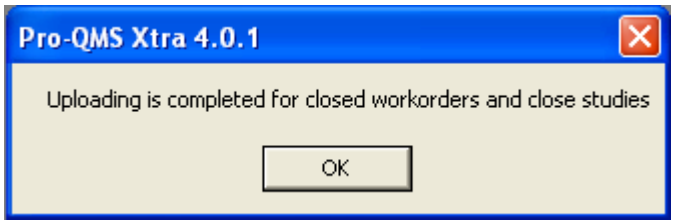
For **Access** Database : Select database with extension *.mdb*.
For **Oracle** Database : Select database extension *.dmp*.
For **SQL Server** Database: All devices on which purged databases are taken will be shown in the list. For any selected device uploading will be carried out. Before uploading, the original device file should be on the same location from where it was taken. If the device files are copied to storage devices and deleted from the hard drives, they should first be restored to the hard drives and then uploading should be carried out. After this has been done, the following message is displayed.



Click **OK** after ensuring that all users are logged out. The following question is displayed.



On confirmation, the Uploading process begins. After completion, the message "Uploading is completed." is displayed.

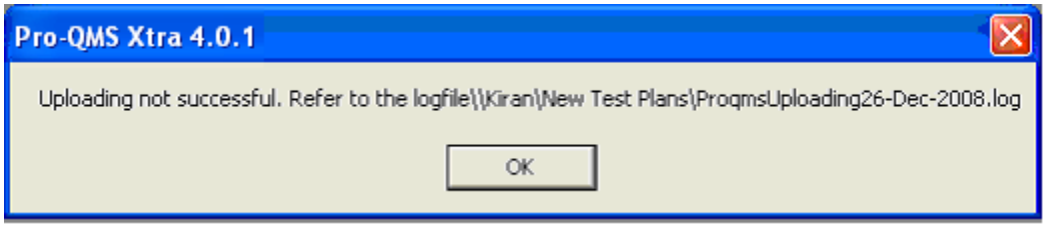


If an attempt is made to upload data from the same database more than once, the message "Data has been already uploaded for the selected file" is displayed.

Steps In Uploading

1. Data to be uploaded is transferred to intermediate tables within the database.
2. Data is transferred to the actual tables after data integrity is verified.
3. Data is deleted from the intermediate tables.

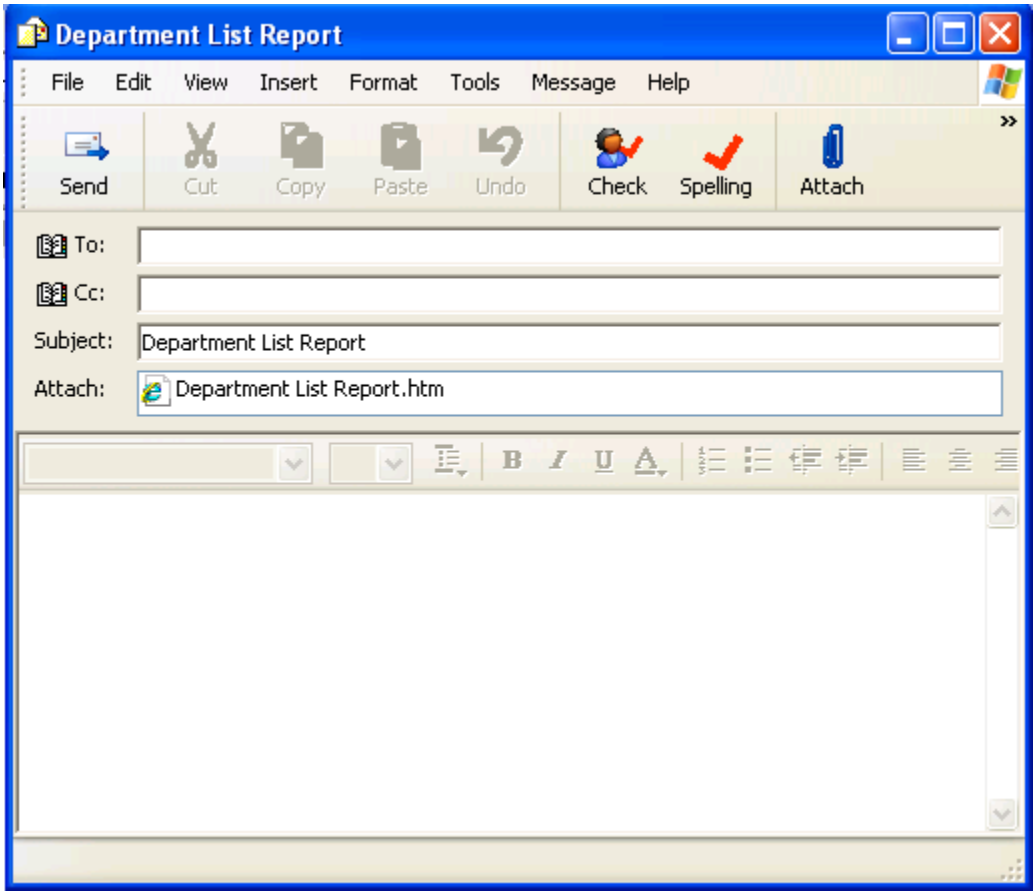
Some related data might have been deleted after Purging and this would cause a problem at the time of Uploading. If at any stage during the Uploading process, an error is encountered, it is displayed on the screen and written into a logfile. This logfile will list all errors encountered. The following message is displayed.



The Administrator must view this file, enter related data and then execute the process once more. The log file will be created in the same directory where the Purged database exists. The name of this file will be *ProQMS-XtraUploading* with the current date appended to it. It will have the extension *.log*.
In case of any error, the database is maintained at the state in which it was before the Uploading process began.

12.6 E-Mail

Select **File/E-mail** from the Main Menu to e-mail a report.
For **E-mail**, the machine must be connected to a network which has mail facility. A report must be active to send e-mail. The default mail client is invoked with the report as an attachment.



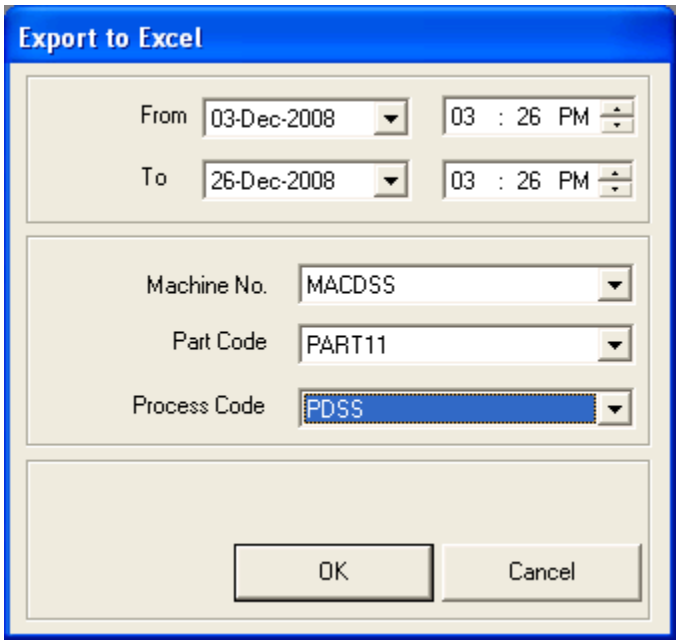
Enter the e-mail address and click **Send** to send the report.

12.7 Exporting To Excel

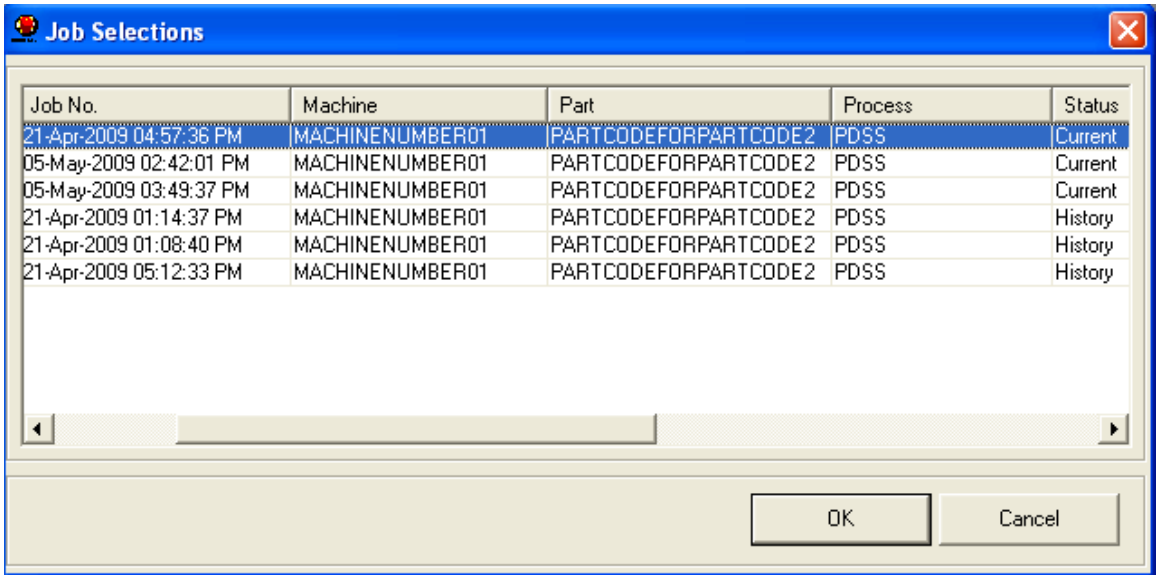
You can export readings for various jobs to **Excel.** Use this facility for Data Analysis based on the Excel Sheets.
Where jobs have more than one parameter, each parameter is displayed on a separate sheet. Both Variable and Attributive parameter details can be exported.

The data displayed in Excel is all the data related to the job along with all calculated data.
For *Variable* parameters, the following details are displayed:
From Date, To Date, From Time, To Time, Work Order Number and Date, Part, Process, Parameter, Machine Number, UsL, LsL, UcLx, LcLx, UcLr, LcLr, Nominal Value, Sample Size, Cp, Cpk, Pp, Ppk, S Sqrt, S Rbar/d2, X Double bar, R bar, Number Of Readings, Sample Number, Reading Serial Number, Reading Date, Reading Time, Readings.
For *Attributive* parameters, the following details are displayed:
From Date, To Date, From Time, To Time, Work Order Number and Date, Part, Process, Parameter, Machine Number, UcL, LcL, Number Of Readings, Subgroup Size, PBar, UBar, NpBar, Cbar, Reading Serial Number, Reading Time, Readings.

For jobs which have not been closed, select a job from the *Local Monitoring* or *Global Monitoring* screen. Click **File|Export to Excel** from the Main Menu. The following screen is displayed.



You may enter Date and Time ranges. If multiple jobs exist, the *Job Selections* screen is displayed.



Select a job and click **OK** to launch the readings worksheet in Excel.
For jobs which have been closed, click **Reports-History|Export to Excel** from the Reports Menu. The *History Summary Report* screen is displayed.
Enter the required selection criteria. If multiple jobs exist, the *Job Selections* screen is displayed.
Select a job and click **OK** to launch the readings worksheet in Excel.
If you wish to save the worksheet, you must manually save it using the **File|Save** option in Excel.

12.8 Import Data

Software can import reading data from an excel file and provide the facility for the statistical analysis using the tools provided by PROQMS.
The screen also provides a facility to select parameter details to create QAPs, Jobs and calculate Cp, Cpk, Pp, and Ppk at the background.
Click on File -> Import Data menu item. A screen for accepting data required for the Import will be launched.
Select Parameter code and Parameter Type. The user has to select the Parameter Type – Attributive or Variable. Depending on the Parameter type the user has to define/select certain properties of variable or attributive parameters and the charts.
If Variable type is selected then the Variable properties of the parameter will be enabled for the user to select or enter-

- Decimal - By default the decimal place will be set to 4. The decimal places should be from 0 to 5 only.
- UOM - By default the UOM will be set to MM
- Tolerance - Tolerance is set to Both side by default. The user can change it to Upper side also.
- The user has to specify the LSL, USL and Nominal values. If Upper option is selected then LSL will be disabled. The value of LSL will be 0.

- Nominal Value - The Nominal value should be less than or equal to USL. In case of Both Sided option, USL should be always greater than or equal to LSL. Nominal value should be between LSL and USL.
- Inspection Technique - By default the Inspection Technique will be set to Sampling. The user can change it to 100% Inspection mode also.

  In case of Sampling, Sample size will be enabled and it will accept value greater than 1. User cannot enter 0 for Sample Size. The sample size is set to 5 by default .If Sample Size is greater than 25 then it is acceptable only if Sample Size mod 5 = 0. If 100% inspection option is selected then Moving Range Size will be enabled in place of Sample Size. For 100% Inspection, the Moving Range Size can be 2,3 or 4.Bydefault the Moving range will be set to 3.
- Charts - For variable type of parameter, X Bar R Chart, X Bar S Chart, Histogram, X Chart, X-MR chart and Median Chart can be selected. If 100% Inspection under Inspection technique has been selected then X Bar S chart under chart tab will be disabled and deselected and only Histogram will be selected by default. If Sample Size is greater than 10 then Median chart option will be disabled and deselected. If Sampling is selected then by default the Histogram and X bar R chart are shown selected.

  If Attributive option is selected then the Attributive properties of the parameter will be enabled for the user to select or enter –

Subgroup Size

Charts -

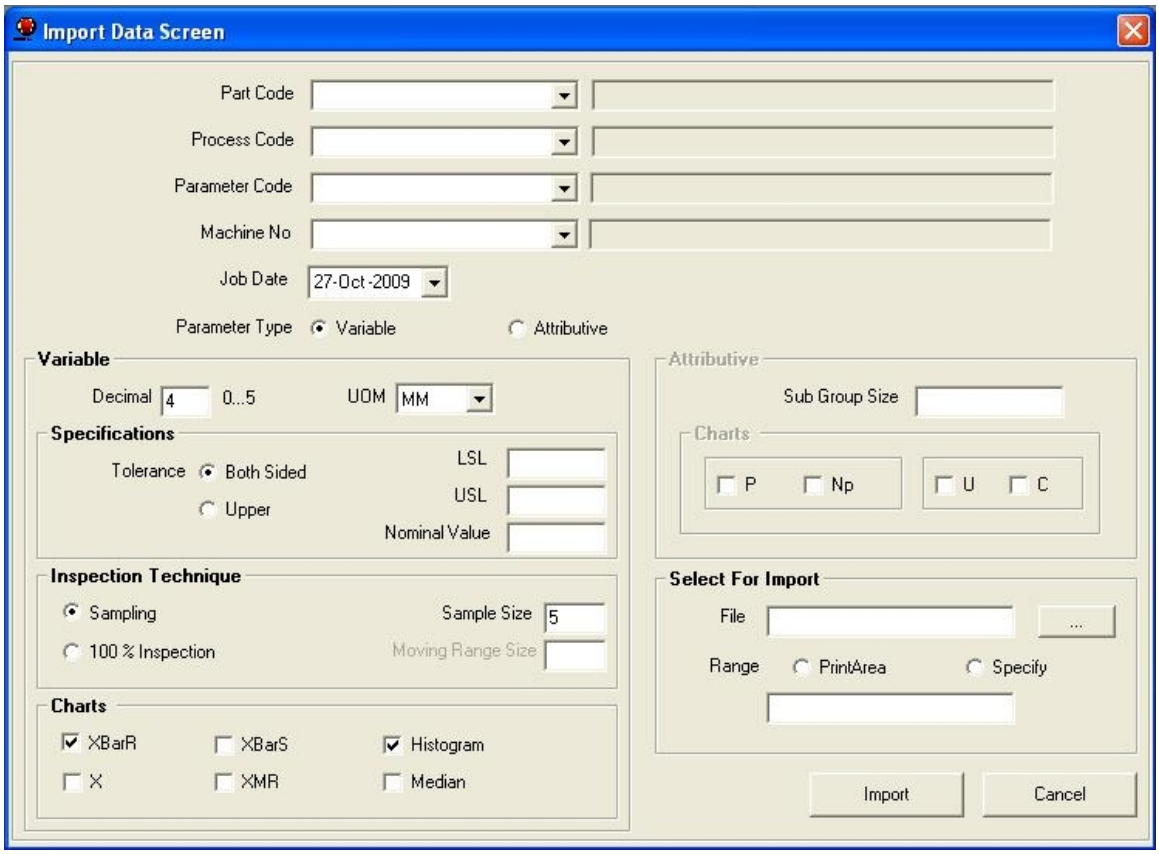
For Attributive type of parameter, P chart, Np chart, U chart and C chart can be selected. If subgroup size is greater than 0 then all charts P, Np, U and C are enabled. If user selects P chart or Np chart then U and C chart are disabled. Similarly, if U chart or C chart is selected then P and Np chart are disabled.

If Subgroup Size is 0 then P Chart and U Chart options are enabled, Np and C chart are disabled. If the user selects P chart then U chart is disabled and if U chart is selected then P chart is disabled.

Select the Excel file from where the reading data wants to import. Click on the "…" button provided to open a file dialog box. Select an .xls file. After the file is selected, the user can either specify the range of data to be selected or select print Area.

After selecting the file and specifying the range Click on Import button, if no errors then display the ‘

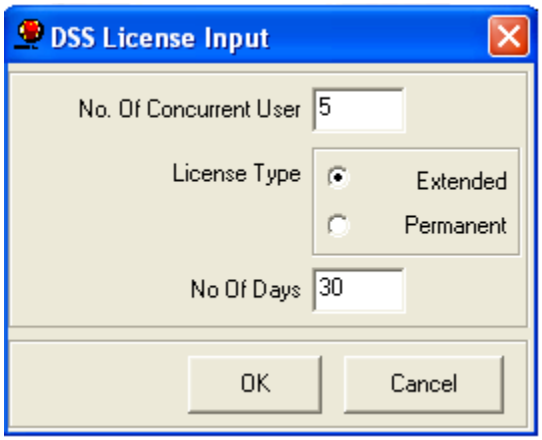
Data successfully imported in Job No J0000001’ and display the Import Monitoring screen. User can select the job and try to launch the measurement screen to see the chart details.



12.9 License

Select **File/Maintenance License** from the Main Menu to provide the information for No of concurrent user, License Type, No of Days for DSS License Screen and Creation of DSSLicense.Inf file, Registration of Pro-QMS License for Maintenance License. Maintenance License menu will get visible only for Role 'INST'.

DSS License Screen –

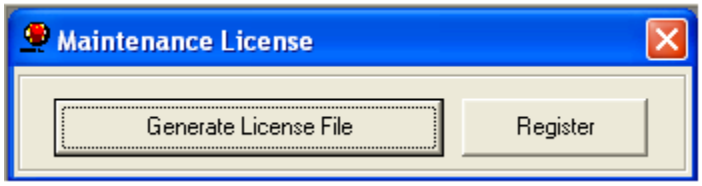


When license type is either temporary or extended, In Demo screen when user clicks on 'Generate License File', System will launch DSS License screen.

When license type is 'Permanent' and user wants to upgrade license i.e. concurrent user then user should use 'Maintenance License' under File menu.

When license type is either temporary or extended, system will enabled 'Extended' or 'Permanent' license type otherwise 'Permanent' will get enabled. When user enters 'No of Concurrent user', 'No of Days' and select License Type and click on OK button. System will create the DSSlicense.Inf file in the application path and system will open the windows explorer i.e. where the DssLicense.Inf file gets created.

Maintenance License –



When customer wants to send license file to DSS for upgrade concurrent user or extend temporary licensing or permanent then user/customer should click on 'Generate License File' button from Maintenance File, system will create the DSSLicense.Inf file. This file should send to DSS.

DSS will send License.Inf to customer as per the DssLicense.Inf file. When customer wants to extend license period or increase number of concurrent user or to do temporary to permanent then customer should use License.inf file. Customer should click on Register button from Maintenance License screen, Registration screen will get display.

13 Reports in ProQMS-Xtra

Please note that for Variable Parameters, the following reports are generated using the Standard Normal Method:

Summary Report, History Summary Report, History Readings Report, All Parameter Readings, Work Order Analysis Report, Machine wise Analysis Report, Excel report, Excel report for history jobs.

13.1 Charts

You may view the **Charts** for a Job when *Local Monitor, Fixture Monitor* or *Global Monitor* screen is active. Select the Job from one of the above-mentioned screen and click on **Charts** from Report option of Main menu. You will get the Date and time dialog box. Select the **Date** and **Time** from respective controls.
Click on the **OK** button to confirm the selection and proceed with the generation of charts. You can view all the charts, which are selected in *Work Order QAP*. For variable parameter the charts available are **Histogram**, **X Bar R**, **X Bar S**, **X-MR**, **X**, **Pre-control** & **Pareto** charts. For *attributive* parameter the charts available are **P, nP, C** & **U** charts.
For all Line Charts: To view details of all actual readings for the samples, use the mouse to move the cursor to the points plotted on the chart.
Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

Chart Descriptions

X-bar and range chart
An X-bar and R (range) chart is a pair of control charts used with processes that have a subgroup size of two or more. The standard chart for variables data, X-bar and R charts help determine if a process is stable and predictable. The X-bar chart shows how the mean or average changes over time and the R chart shows how the range of the subgroups changes over time. It is also used to monitor the effects of process improvement theories. As the standard, the X-bar and R chart will work in place of the X-bar and s or median and R chart.

X-bar and sigma chart
An X-bar and s (sigma) chart is a special purpose variation of the X-bar and R chart. Used with processes that have a subgroup size of 11 or more, X-bar and s charts show if the system is stable and predictable. They are also used to monitor the effects of process improvement theories. Instead of using subgroup range to chart variability, these charts use subgroup standard deviation. Because standard deviation uses each individual reading to calculate variability, it provides a more effective measure of the process spread.

Histogram

A histogram is a bar graph of raw data that creates a picture of the data distribution. The bars represent the frequency of occurrence by classes of data. A histogram shows basic information about the data set, such as central location, width of spread, and shape. Use histograms to assess the system's current situation and to study results of improvement actions. The histogram's shape and statistical information help you decide how to improve the system. If the system is stable, you can make predictions about the future performance of the system. After improvement action has been carried out, continue collecting data and making histograms to see if the theory has worked.
Descriptive statistics, such as chi-square, kurtosis, and skewness can help you interpret the histogram and can show you if the data distribution is normal.

Pre-Control chart
A pre-control chart is a chart for online reading analysis.

X chart
A run chart or X chart is a line graph of data plotted over time. By collecting and charting data over time, you can find trends or patterns in the process. Because they do not use control limits, run charts cannot tell you if a process is stable. However, they can show you how the process is running. The run chart can be a valuable tool at the beginning of a project, as it reveals important information about a process before you have collected enough data to create reliable control limits.

X-MR chart
An individuals and moving range (X-MR) chart is a pair of control charts for processes with a subgroup size of one. Used to determine if a process is stable and predictable, it creates a picture of how the system changes over time. The individual (X) chart displays individual measurements. The moving range (MR) chart shows variability between one data point and the next. Individuals and moving range charts are also used to monitor the effects of process improvement theories.

Pareto Diagram
A Pareto diagram is a simple bar chart that ranks related measures in decreasing order of occurrence. The principle was developed by Vilfredo Pareto, an Italian economist and sociologist who conducted a study in Europe in the early 1900s on wealth and poverty. He found that wealth was concentrated in the hands of the few and poverty in the hands of the many. The principle is based on the unequal distribution of things in the universe. It is the law of the "significant few versus the trivial many." The significant few things will generally make up 80% of the whole, while the trivial many will make up about 20%.
The purpose of a Pareto diagram is to separate the significant aspects of a problem from the trivial ones. By graphically separating the aspects of a problem, a team will know where to direct its improvement efforts. Reducing the largest bars identified in the diagram will do more for overall improvement than reducing the smaller ones.

Median Chart

A median chart is a special purpose variation of the X-bar chart. This chart uses the median instead of the subgroup average to show the system's central location. The median is the middle point when data points are arranged from high to low. The chart shows all the individual readings. Use charts to determine if the system is stable and predictable or to monitor the effects of process improvement theories.

p-chart

A p-chart is an attributes control chart used with data collected in subgroups of varying sizes. Because the subgroup size can vary, it shows a proportion on nonconforming items rather than the actual count. P-charts show how the process changes over time. The process attribute (or characteristic) is always described in a yes/no, pass/fail, go/no go form. For example, use a p-chart to plot the proportion of incomplete insurance claim forms received weekly. The subgroup would vary, depending on the total number of claims each week. P-charts are used to determine if the process is stable and predictable, as well as to monitor the effects of process improvement theories.

np-chart

An np-chart is an attributes control chart used with data collected in subgroups that are the same size. Np-charts show how the process, measured by the number of nonconforming items it produces, changes over time. The process attribute (or characteristic) is always described in a yes/no, pass/fail, go/no go form. For example, the number of incomplete accident reports in a constant daily sample of five would be plotted on an np-chart. Np-charts are used to determine if the process is stable and predictable, as well as to monitor the effects of process improvement theories.

u-chart

A u-chart is an attributes control chart used with data collected in subgroups of varying sizes. U-charts show how the process, measured by the number of nonconformities per item or group of items, changes over time. Nonconformities are defects or occurrences found in the sampled subgroup. They can be described as any characteristic that is present but should not be, or any characteristic that is not present but should be. For example, a scratch, dent, bubble, blemish, missing button, and a tear are all nonconformities. U-charts are used to determine if the process is stable and predictable, as well as to monitor the effects of process improvement theories

c-chart

A c-chart is an attributes control chart used with data collected in subgroups that are the same size. C-charts show how the process, measured by the number of nonconformities per item or group of items, changes over time. Nonconformities are defects or occurrences found in the sampled subgroup. They can be described as any characteristic that is present but should not be, or any characteristic that is not present but should be. For example a scratch, dent, bubble, blemish, missing button, and a tear would all be nonconformities. C-charts are used to determine if the process is stable and predictable, as well as to monitor the effects of process improvement theories.

13.2 Tray Tracking

When g_HeatTreatment flag is true, then in Configuration menu Tray Tracking sub menu will get visible. User selects Tray Date, Tray Time and Parameter Category for displaying Tray tracking chart for variation of parameter category. It will provide the information for Tray Tracking for Variation of Parameter Category Screen.

In this screen, user can select or enter Tray Date, select Tray Time and Parameter Category. Tray Date will get populated from Tray Time Entry screen. When user has selected the Tray Date then system will populate all Tray Time entered for selected date. System has provided facility to select maximum 2 Parameter Category. On selection of parameter category Ok button will get enabled. Cancel button has provided to close the screen.

13.3 History Charts

You may select the part from the **Part No** drop-down list. You may select the Process from the **Process** drop-down list. You may select the **Work Order No**, **Date**, **Machine No**, **Job Start Date-Time** from respective drop-down list. You may check the **Filter** check box, of **Job Start Date** to display only the Jobs created between the specified dates. When this check box is checked, two drop-down lists will appear on the dialog box. They may be used to set the **From** and **To** dates. Depending upon **From** and **To** dates **Machine Number** & **Job Start Date-Time** drop down list is populated. *History Charts* can be launched only for closed jobs, if the readings have been taken.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. You can view all the charts i.e. depending upon the type of parameter, which were selected at the time of creation of **work order** for a selected job.
For all Line Charts: To view details of all actual readings for the samples, use the mouse to move the cursor to the points plotted on the chart.
Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.4 History Card-

Gauge Management Flag is true. In Report menu display History card.
When user selects History Card from report menu, display History Card screen.
In History card screen display Instrument Available and Instrument selected List box.
Display four Navigation button for move instrument from Instrument Available to Instrument selected and vice-a-versa. If user select more than one Instrument and click on Ok then display the histroy of the Instrument on different worksheet in Excel.

13.5 Histogram

When you need to discover and display the distribution of data by bar graphing the number of units in each category, histograms are extremely useful.
The following information is displayed on the Histogram:
Header Region - Displays all the header information such as Company Name, Work Order No. / Job No, Part Code, Process, Part Parameter, Machine, Unit of Measurement and Sample Size. If the chart is being plotted for a specific period, then From date and time and To date and time are displayed. Current date and time are displayed in the top right corner of the chart.
Footer region - Displays all the footer information such as LSL, USL, Nom Val, Abs Nom, N (No. Of readings),
Chi-Square, Result, X Bar, Xmin, Xmax,Conf. Level, LCLx,UCLx, Standard Deviation (SQRT),
Standard Deviation (Rbar/D2),Deg. Of Freedom, -3Sigma%, -2Sigma%, -1Sigma%, +1Sigma%, +2Sigma%, +3Sigma%, Skewness, Kurtosis, Xout of Tol,
Defect%,DPM,Note, Cp, Cpk, Pp, PPk
Optimized λ value also will be displayed in the footer region of the histogram in case of boxcox option selection.

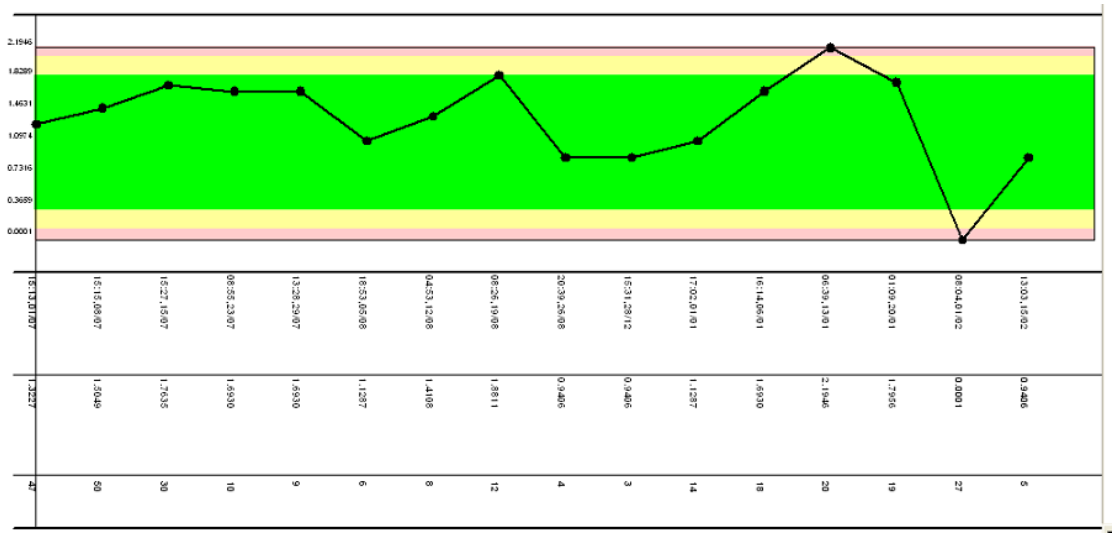
Please refer to **SPC Formulas** for details

13.6 Weekly Cp/Cpk/ Pp/ Ppk Trend Chart

Based on the selection of date for current or history job, system will display weekly trend chart of Cp/Cpk/Pp/Ppk.
In this chart, based on the selection of date system will calculate the no of weeks for a selected period and one by one week system will calculate Cp, Cpk, Pp, Ppk value and stored.
Chart Screen will show 4 sub menus under Chart menu that is Cp Trend Chart, Cpk Trend Chart, Pp Trend Chart, and Ppk Trend Chart. Each chart will show parameters for selected job.
Chart has two regions, 1st is Header region and 2nd is Chart region.

Header region- Displays all the header information such as Chart Name, Company Name, From Date, To Date, Job No., Part Para, Part Code / Name, Machine, Process, UOM.

Chart Region



On Chart X axis, system will show reading date-time for the first reading of the week, Cp/Cpk/ Pp/ Ppk value and total no of reading for individual week and Y-axis slot will calculate based on min & max value of Cp/Cpk/ Pp/ Ppk.
On mouse move operation, system will show Total No of Reading, Cp/Cpk/ Pp/ Ppk value, 1st Reading date-time of selected week.

When user selects Cp or Pp Trend Chart and Specification limit for a parameter is Upper side then system will prompt the message 'No Cp/Pp trend available for Parameter as Single sided [Upper] " & PARACODE
When user selects the data for less than 14 days then system will prompt the message 'User should select the date for more than or equal to 2 weeks' and focus will set to To Date.

When user selects the data for more than 14 days, system starts week calculation data from 1st reading of the selected From date after 00.00 am to next 7 days till To date and time is up to 23.59 pm.
Ex. When user has selected period 01-Feb-2011 to 28-Feb-2011 then system will make 1st week as 01-Feb-11 to 07-Feb-2011 if data is available from 03-Feb11 then system will calculate data in following way.
1st week - 03-Feb-2011 To 09-Feb-2011
2nd week – 10-Feb-2011 to 16-Feb-2011
3rd week - 17-Feb-2011 to 23-Feb-2011
4th week – 24-Feb-2011 to 28-Feb-2011

Tray Tracking Chart –
When g_HeatTreatment flag is true and user has selected Tray Date, Time and

Parameter Category in Tray Tracking screen and click on Ok button then system will take the data from JobReading, OutOfSpecJobReading based on Tray Time, Captured Time and stored it in a (TempVariationPHT) temporary table.

Example –

Tray Date – 06-Jun-2011, Tray Time – 12:12 PM, Parameter Category – TEMP

Zone	PartParaCode	Captured Time	Reading Date	Reading Time
PHZ	PHZ1TEM	1	06-Jun-2011	12:13 PM
PHZ	PHZ1TEMP	3	06-Jun-2011	12:15 PM
PHZ	PHZ1TEM	4	06-Jun-2011	12:16 PM
PHZ	PHZ1TEMP	6	06-Jun-2011	12:18 PM

I.e Based on Parameter, Captured Reading Time system will pick the data from JobReading/OutOfSpecJobReading table and stored in Temporary table.

Charts have two regions namely Header and Chart.

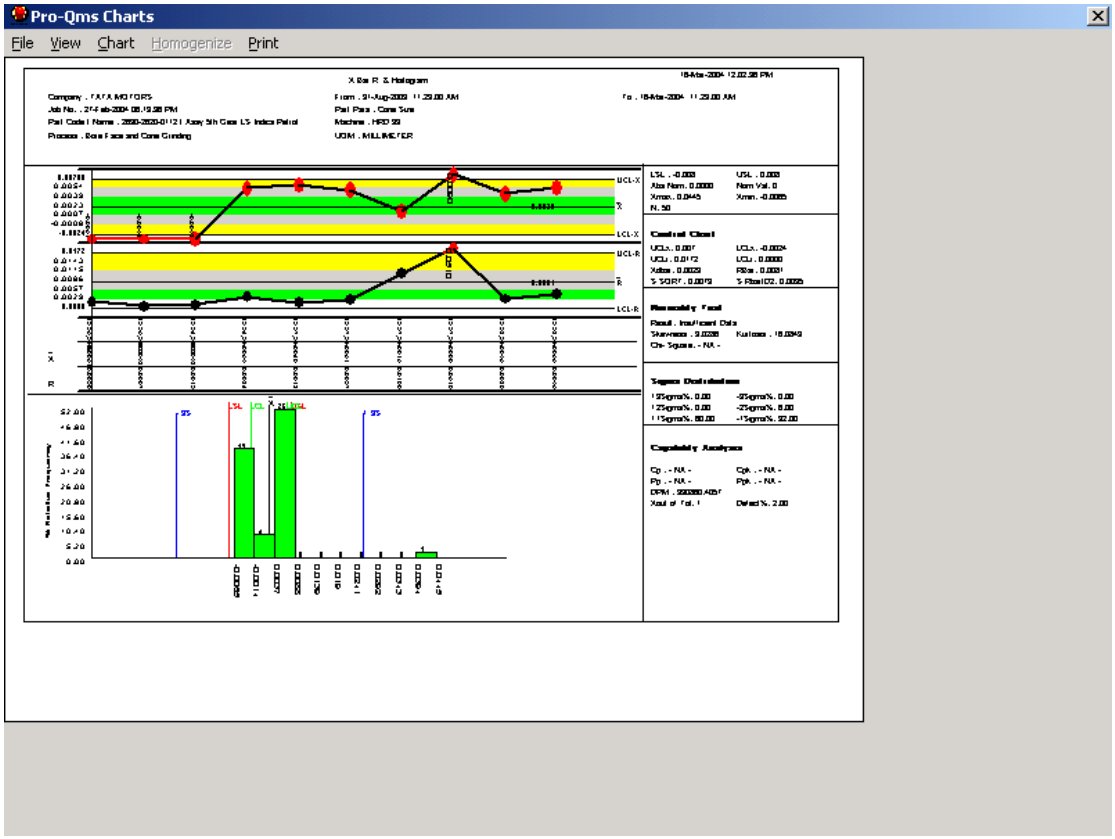
In Header Portion will show Company Name, Tray Date, and Tray Time.

Chart Region –
Based on selection of parameter category system will draw Y axis i.e If user has selected 2 parameter category then system will draw a scale on Y1 of first category and Y2 axis of second category based on LSL, USL of parameter category. On X Axis, system will draw the scale for Time based on Captured Reading Time and also draw the region, label for Zone in that region.
System takes 1st Parameter category and sorts the table by ZoneSequence, CapturedTime and then draws the individual point in black color, once 1st parameter category gets finished, system will start processing for 2nd category and draw individual point in red color.
Just below the chart, category wise individual point Reading Date, Reading Time and Reading will be displayed in a label. On mouse move, system will display Zone, Parameter, Reading, Reading Date and Reading Time

When chart get launched, system will add 2 menu namely category that user has selected, if user has uncheck the category then system will remove the Reading, Reading Date, Reading Time label from a chart.
Bottom of chart, system will show the legend from which user can identify category.

13.7 Combine Charts

Combine charts will be displayed only if X Bar R chart and Histogram are selected while creating the job. Combine charts plot both charts simultaneously.


Pro-Qms Charts
File View Chart Homogenize Print
X Bar R & Histogram
UCL-X
LCL-X
UCL-R
LCL-R

13.8 Chart Form Menu

When you view any chart, the following menu is displayed:

File - The sub options are:
Close - close the current chart
Exit - close the chart form
Save as Image
Save as Image For QS9000

View –The sub options are:
Zoom - 50%, 100%, 150%, 200%
Fill Style – Solid Fill, Transparent, Horizontal Lines, Vertical Lines, Upward Diagonal Lines, Downward Diagonal Lines.

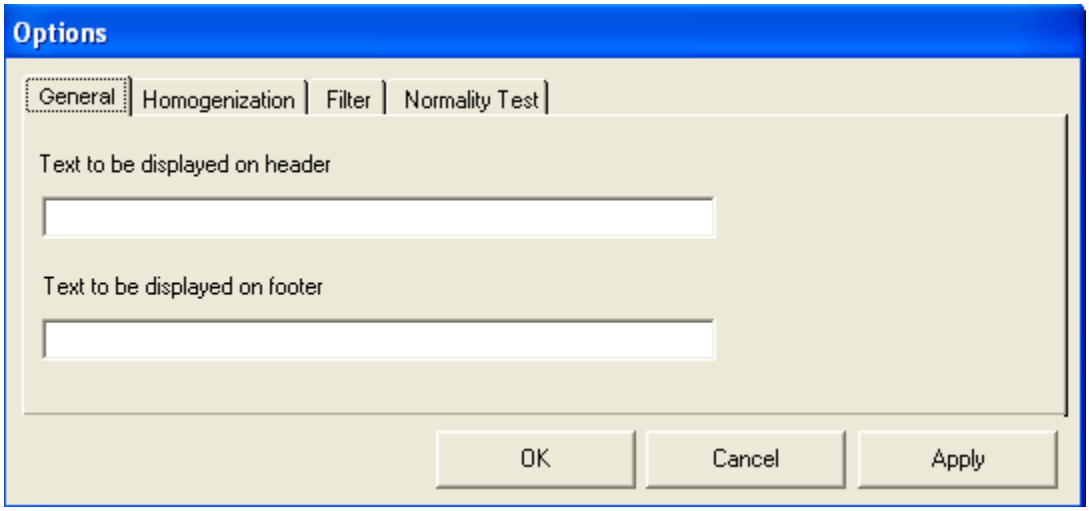
Chart – The sub options are the charts available for selected job for each parameter. The first level contains chart types available, and the next level for each type will be the parameters for which chart is plotted.

Print - Enter different settings such as number of copies, printer name, print range etc.

Trend - This option is available only if X Bar R chart is shown on the chart screen. If trends are present, the Print Dialog box is displayed. Click **Ok** to print the *Trend Summary Report* for that job.

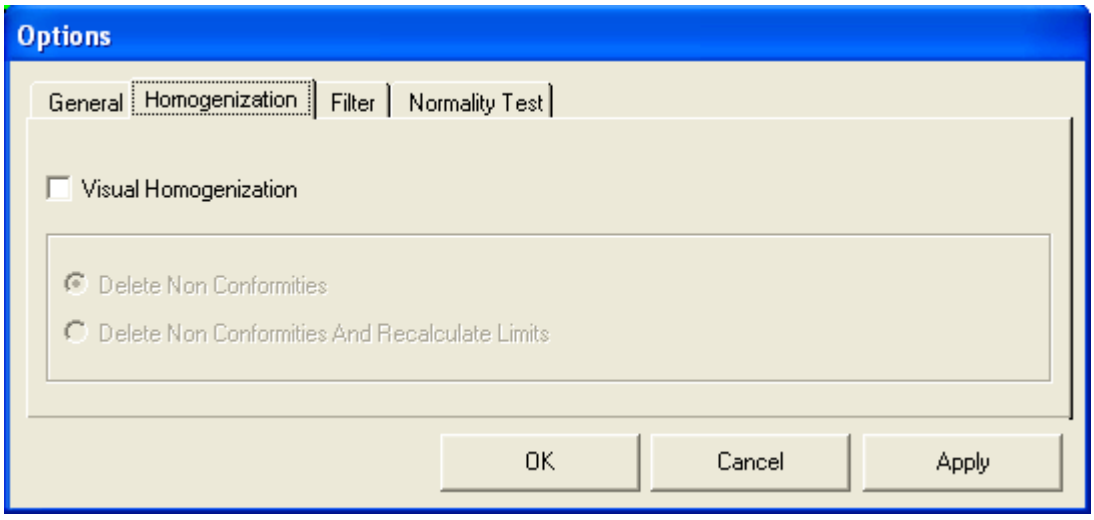
13.9 Chart Options

While viewing a Chart, select **Options** from the Chart menu to launch the Options dialog box to specify Chart Options. There are 4 tabs in this form.
The 1st tab is the **General Tab** here you can set the text that will be displayed in the Header and Footer Section of the chart. These details will be displayed when the chart is plotted.



The 2nd option is that of Homogenization, by default the **Homogenize** option is disabled. On selecting the **Visual Homogenization** option it will enable the **Homogenize** option in the menu. There are 2 more options provided such as:

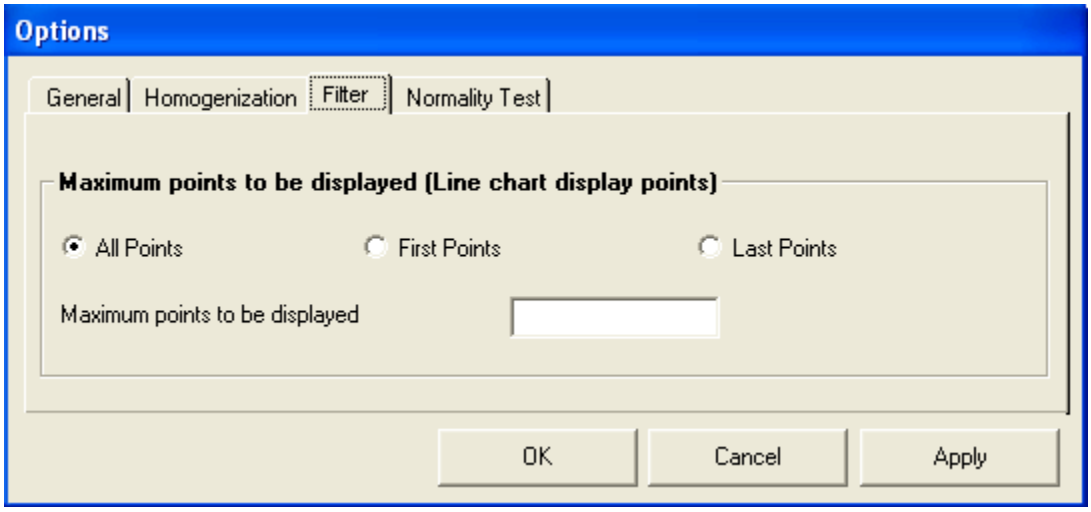
- Delete Non Conformities
- Delete Non Conformities and Recalculate Limits



The 3rd option is the **Filter** option. Here you can specify the maximum points to be displayed on the chart. There are 3 radio buttons provided in the tab:

- All Points - The chart will be plotted for all the readings
- First Points – This option enables you to display the first set of readings
- Last Points -This option enables you to display the last set of readings

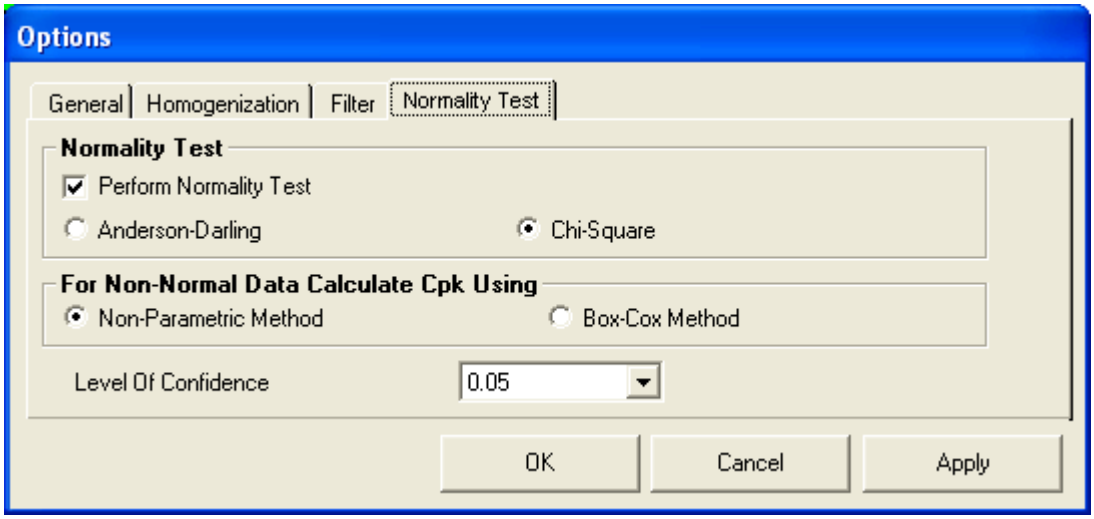
Enter Maximum Number Of Points to be displayed on the chart.



The 4th option is related to the **Normality Test.** Here you can specify the method to calculate Cpk for non-normal Data. The two options are:

- Non-Parametric method
- Box-Cox method

The Non-Parametric method is selected by default. Specify the level of confidence by selecting values from the drop down list.



13.10 Process Capability Study Report

Process Capability Study report is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

Click on **Reports→ Process Capability Study Report**, (Date Selection Screen) is launched on the click of OK will launch Process Capability Study Report.

OR

Click on **Reports→History→Process Capability Study Report**, History Process Capability Study Report screen is launched on the click of OK will launch Process Capability Study Report.

You may select period from & period to. Machine No will get populated depending upon the selection of dates. Part Code will get populated depending upon the selected Machine No. Process Code will get populated depending upon the selected Part Code. Click on OK button, which will launch the excel report.

If Cpk value is less than 1.33 then Cpk value display on excel cell should be in red color (fore-color) and all other columns will display in Normal color (Black) in case of Greaves only else all columns will be in black and also Header of Excel sheet should be Location description (which is in link with Machine No) of 1st Job [Selected] from Monitor screen.

Process Capability Study Report for the specified criteria gives idea to the supervisor about the Process Capability details for the selected Jobs

13.11 Process Capability Study Report – Run Chart

Process Capability Study report – Run Chart is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

Click on **Reports→Process Capability Study Report-Run Chart**, (Date Selection Screen) is launched on the click of OK will launch Process Capability Study Report-Run Chart.

OR

Click on **Reports→History→Process Capability Study Report-Run Chart**, History Process Capability Study Report screen is launched on the click of OK will launch Process Capability Study Report-Run Chart.

You may select period from & period to. Machine No will get populated depending upon the selection of dates. Part Code will get populated depending upon the selected Machine No. Process Code will get populated depending upon the selected Part Code. Click on OK button, which will launch the excel report.

If Cpk value is less than 1.33 then Cpk value display on excel cell should be in red color (fore color) and all other columns will display in Normal color (Black) in case of Greaves only else all columns will be in black. This will be done for both jobs current & closed.

Header of Excel sheet should be Location description (which is in link with Machine No) of 1st Job [Selected] from Monitor/Global Monitor screen.

Process Capability Study Report Run Chart for the specified criteria gives the idea to the supervisor about the Process Capability-Run Chart details for the selected Jobs.

13.12 Process Capability Study Report – Histogram

Process Capability Study report – Histogram is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

Click on Reports→Process Capability Study Report-Histogram, (Frmchartdates) is launched on the click of OK will launch Process Capability Study Report-Histogram.

OR

Click on Reports→History→Process Capability Study Report-Histogram, History Process Capability Study Report screen is launched on the click of OK will launch Process Capability Study Report-Histogram.

You may select period from & period to. Machine No will get populated depending upon the selection of dates. Part Code will get populated depending upon the selected Machine No. Process Code will get populated depending upon the selected Part Code. Click on OK button, which will launch the excel report.

If Cpk value is less than 1.33 then Cpk value display on excel cell should be in red color (fore color) and all other columns will display in Normal color (Black) in case of Greaves only else all columns will be in black. This will be done for both jobs current & closed.

Header of Excel sheet should be Location description (which is in link with Machine No) of 1st Job [Selected] from Monitor/Global Monitor screen.

Process Capability Study Report Histogram for the specified criteria gives the idea to the supervisor about the Process Capability-Histogram details for the selected Jobs

13.13 History Summary Report

You may select the part from the **Part No** drop-down list. You may select the Process from the **Process** drop-down list. You may select the **Work Order No**, **Date**, **Machine No**, **and Job Start Date-Time** from respective drop-down list. You may check the **Filter** check box, of **Job Start Date** to display only the Jobs created between the specified dates. When this check box is checked, two drop-down lists will appear on the dialog box. They may be used to set the **From** and **To** dates. Depending upon **From** and **To** dates **Machine Number** & **Job Start Date-Time** drop down list is populated. *History Summary Report* can be launched only for closed jobs, if the readings have been taken.

Click on the **OK** button to confirm the selection and proceed with the generation of reports. *History Summary Report* gives the idea about the summary of a selected closed job. It shows the total number of **readings, control limits, Mean, S.D., Pp, Ppk, Cp & Cpk** for all parameter for selected closed jobs. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.14 History Readings Report

You may select the part from the **Part No** drop-down list. You may select the Process from the **Process** drop-down list. You may select the **Work Order No**, **Date**, **Machine No**, **Job Start Date-Time** from respective drop-down list. You may check the **Filter** check box, of **Job Start Date** to display only the Jobs created between the specified dates. When this check box is checked, two drop-down lists will appear on the dialog box. They may be used to set the **From** and **To** dates. Depending upon **From** and **To** dates **Machine Number** & **Job Start Date-Time** drop down list is populated. *History Charts* can be seen only for closed jobs if the readings have been taken.

Click on the **OK** button to confirm the selection and proceed with the generation of reports. *History Readings Report* gives the idea about all details related to closed jobs. It shows the readings of all parameters, average and range for a sample. It shows the **Max value**, **Min value**, **control limit**, **Cp, Cpk**, **Accept** and **Reject**, **S.D.** for a selected job. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.15 All Parameter Reading Report (Different Jobs – One Part)

All Parameter Reading Report (Different Jobs – One Part) is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

Click on Reports→All Parameter Reading Report (Different Jobs – One Part) will launch Date Selection screen and on OK

Click on Reports→History→All Parameter Reading Report (Different Jobs – One Part) will launch History Reading screen, select data and click on OK

All Parameter Reading Report (Different Jobs – One Part) display information of selected jobs that cover Part code,

Part Name, Job No, Process, Machine, Parameter, USL Value, LSL Value, Reading Serial No, Readings on Excel sheet.

User can see the record of multiple jobs with all parameter of different job for one part at a glance.

13.16 History Export To Excel

Export To Excel is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

You can export readings for a jobs to Excel. Use this facility for Data Analysis based on the Excel Sheets.Where jobs have more than one parameter, each parameter is displayed on a separate sheet. Both Variable and Attributive parameter details can be exported.The data displayed in Excel is all the data related to the job along with all calculated data.

For Variable parameters, the following details are displayed:

From Date, To Date, From Time, To Time, Work Order Number and Date, Part, Process, Parameter, Machine Number, UsL, LsL, UcLx, LcLx, UcLr, LcLr, Nominal Value, Sample Size, Cp, Cpk, Pp, Ppk, S Sqrt, S Rbar/d2, X Double bar, R bar, Number Of Readings, Sample Number, Reading Serial Number, Reading Date, Reading Time, Readings.

For Attributive parameters, the following details are displayed:

From Date, To Date, From Time, To Time, Work Order Number and Date, Part, Process, Parameter, Machine Number, UcL, LcL, Number Of Readings, Subgroup Size, PBar, UBar, NpBar, Cbar, Reading Serial Number, Reading Time, Readings.

For jobs, which have not been closed, select a job from the Local Monitoring or Global Monitoring screen. Click File|Export to Excel from the Main Menu. The Export to Excel screen is displayed.

13.17 QS-9000 Report

QS-9000 report is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

13.18 Trend Summary Report

Trend Summary Report is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

Click on Reports→Trend Summary Report will launch Date Selection screen and on OK

Click on Reports→History→ Trend Summary Report will launch History Trend Summary, select data and click on OK

Select the Job from one of the above-mentioned screen and click on **Trend Summary report** from Report of Main menu. You will get the Date and Time dialog box. Select the **Date** and **Time** from respective controls.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Trend Summary Report* provides summary of the selected job during the specified period. It displays the Trend raised and the count for all parameter for selected job. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.19 Remarks Report

Remark Report is a pre-formatted report. This report will be launched for Current and closed jobs. For current jobs Local or Global Monitor screen should be active and completed more than five samples for individual parameter. For Closed jobs History selection screen will be used.

Remark Report will display the event remarks that have been already entered for samples and readings of selected job and all variable parameters associated with that job.

Click on Reports→Remarks Report is launched on the click of OK.

OR

Click on Reports→History→ Remarks Report, History Remarks screen is launched on the click of OK will launch Remarks Report.

Search Engine Screen will launch with caption 'Screen for Accepting Report Dates'. It will display Machine No., Part Code and Process Code selected from Local Monitoring or Global Jobs screen. Select **date and time range** as a selection criterion for Event Remark report display. Click OK button. If data is not available for the selected date & time then it will display the message as 'No event remarks available for the parameter(s)'. If data is available for the selected criteria it will launch the Event Remark Report.

For a closed job the History Remarks Report screen will be used for launching the report.

13.20 Machine wise analysis

You may first select the machine from the **Machine No** drop-down list. You may then select the dates to mark the period from the **Period From** and **To** drop-down list. Machine-wise Analysis Report can be launched only for jobs that have been closed. Click on the **OK** button to confirm the selection and proceed with the generation of reports. Machine-wise Analysis report gives the idea about part, process and all work orders, control limits, Cp, Cpk, Pp & Ppk. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.21 Gauge Calibration History Calibration

Use this option to generate Instrument Calibration History Report which displays information of Instrument No, Calibration date, Calibration due date, Calibrated In house /Company, Remarks, Step code, Description, LSL, USL, Wear Value

13.22 Gauge Calibration Due

Select the dates to mark the period from **Period from** and **To** drop-down lists. The instruments available for calibration are displayed in the **Instruments Available** list. You may then use the selection/de-selection buttons to move the instruments to **The Instruments Selected** list. *Gauge Calibration Due Report* is used to display the instruments that have to be calibrated during the specified period.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. It displays the information about instrument along with the calibration date, location & who is responsible for the same. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.23 Gauge Calibration Overdue

Select the **Gauge Calibration Overdue As On** date. You then get a list of **Available Instruments No**, for which the report may be generated. You may then use the selection/de-selection buttons to move the instruments to the **Selected Instruments No** list. *Gauge Calibration Overdue Report* is used to display the instruments that are overdue for calibration on the specified date.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. It displays the information about the instrument along with the calibration due date, location & who is responsible for the same. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.24 Quality Assurance Plan Summary

You may generate a report on the summarized Quality Assurance Plan by selecting the option Quality Assurance Plan Summary from the Main menu. *Quality Assurance Plan Summary* report gives the idea about all related to Part, Process & Parameters. For each parameter which instrument has been used for dumping the reading, what are the Specification limits, control limits, unit of measurement, Sample size & frequency.
Note: When the report is generated two buttons are added to the toolbar menu. Also a list box is displayed for setting the zoom level for easy viewing of the report on the screen. When the report is generated you may print it by clicking the Print button on the toolbar menu. You export report in HTML or Text format by clicking the Export button on the toolbar menu. You set the zoom level to desire by selecting a suitable value from the Zoom drop down list.

13.25 Quality Assurance Plan Detail

Select a part(s) from the **Parts Available** list, you may then use the selection/de-selection buttons to move the selected part(s) to the **Selected Parts** list. *Quality Assurance Plan Detail* gives the details related to a Part.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Quality Assurance Plan Detail* gives the detailed information about quality assurance plan for the selected part(s). Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.26 Audit Trail For Homogenized Samples

Click on the **OK** button to confirm the selection and proceed with the generation of reports. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.
You may generate the *Audit Trail For Homogenized Samples* report through this screen. On the screen you have to specify the following ranges by selecting appropriate values for the fields listed below:
Part No - select **From Part No** and **To Part No** list boxes
Process - select **From Process** and **To Process** list boxes
Parameter - select **From Parameter** and **To Parameter** list boxes
Deleted date - select **From Deleted Date** and **To Deleted Date** list boxes
Drop down lists of all controls will be filled up only when samples have been homogenized from charts.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. This report displays the details about when the sample has been homogenized and remarks that have been entered while homogenizing. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.27 Cost of Internal rejection

Use this option to generate a report on the parts rejected during internal quality testing. Specify the required period by entering **Period From** and **Period To**. Select the required parts from the **Available Parts** list using the selection/de-selection buttons.
This report can be seen only after closing the Job and if the Disposal Action has been taken.
Click **OK** to confirm the selection and proceed with the generation of report. This report provides details about the Cost of raw material, Cost of repair, Cost of processing and the Disposal action for a closed job. Click **Cancel** to exit.

13.28 Summary Report

You may generate a report on **Summary Report** when *Local Monitoring* or *Fixture Monitoring* or *Global Monitoring* screen is active. Select the Job from one of the above-mentioned screen and click on **Summary report** from Report of Main menu. You will get the Date and Time dialog box. Select the **Date** and **Time** from respective controls. Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Summary Report* provides summary of the selected job during the specified period. It displays the control limits, Mean, S.D., Pp, Ppk, Cp & Cpk for all parameter for selected job. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.29 All Parameter Readings Report

You may generate a report on **All Parameter Readings Report** when *Local Monitoring* or *Fixture Monitoring* or *Global Monitoring* screen is active. First Select the job from one of the above-mentioned screen and click on **All Parameter Readings Report** from Report of Main menu. You will get the Date and time dialog box. Select the **Date** and **Time** from respective controls.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *All Parameter Readings Report* provides all details related to that job. It shows the readings of all parameters for selected job. It displays the average and range for a sample. It shows the Max value, Min value, Control limit, Cp, Cpk, Accept and Reject, S.D. for a specified period for a selected job. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.30 All Parameter Readings Report (Station Wise)

Use this option to generate a All Parameter Reading Report (Station wise) which displays information of all jobs that come under selected period for selected station no that cover Part code, Job No, Process, Machine, Parameter, USL Value, LSL Value, Reading Serial No, Readings on Excel sheet

Clicks on Report→All Parameter Reading Report (Station Wise)

All parameter reading report form will get launch with From Date, From Time, To Date, To Time with current date & current time & Station No list box that contain no record.

Station No list box will get filled when selected period have readings.

Click on Cancel button or close (X) form will get unloaded.

Click on Ok button, report that is in the form of excel get launch depending upon the selection of date & station no.

In Excel, each sheet contains all jobs that come under one station no for selected period that is arranged job serial no wise.

Report contain Company Name at the top of the sheet, Report Name, Report launch date, from date, to date & detail field contain Job No, Part Code-Description, Process Code-Description, Machine, Parameter Code-Description, LSL, USL, Reading Serial No.

History job will be identified, by adding the History word after the Job No

13.31 Resend Trend Email

13.31.1Resend Trend Email – Manual

Clicks on Report-> Resend Trend Email-> Manual [More than one Machine], Resend Trend Email form will get launch with Date as current date & Shift No list box that contain all shift from master & Machine No list box contain machine for selected date. When user click on Cancel button form will get unloaded.

When user click on OK button, trend for selected date, shift, machine will gather & convert this into .pdf file and then default mail client will get launch with currently created pdf file as an attachment & predefined subject, body message & To, CC, BCC is empty to enter email id that user want to send the mail.
After sending mail display message 'Email Send'
If no trend found for selected date, shift & machine message will display 'No Trend Raised'. Report contains report name, company name, report date, shift, shift time, station no, machine no, part no, process no, parameter & its description, job no, sample no, sample time, trend description etc.

13.31.2Resend Trend Email – Automatic

Clicks on Report-> Resend Trend Email-> Automatic [One Machine], Resend Trend Email form will get launch with Date as current date & Shift No list box that contain all shift from master & Machine No list box contain machine for selected date.
Click on Cancel button form will get unloaded.
Click on OK button, trend for selected date, shift, machine will gather & convert this into .pdf file & then mail will go with currently created pdf file as a attachment, predefined subject, body message and predefined mail id which is based on shift & mail id.

After sending mail display message 'Email Send'
If no trend found for selected date, shift & machine message will display 'No Trend Raised'.

Report contains report name, company name, report date, shift, shift time, station no, machine no, part no, process no, parameter & its description, job no, sample no, sample time, trend description etc

13.32 Partwise Daily Cp/Cpk or Pp/Ppk Report

Daily Cp Cpk/ Pp Ppk Report will display the Cp cpk or Pp Ppk details for all the selected parameters defined in all the Job or work orders created between the specified period.

Click on Report -> Daily Cp Cpk/ Pp Ppk Report menu item. A screen for accepting report Dates will be launched. Specify the required period by entering **Period From and Period To**. Select the required **Parameter** from the parameter list. Select **Cp-Cpk** data or the Pp-Ppk data as per the requirement. Click OK to confirm the selection and proceed with the generation of report. Click **Cancel** to exit.

Report will display company name and report name in the report title. Right hand corner of report will display current date in dd-mmm-yyyy hh:mm:ss AM/PM format. From and To Date selected from the Report dates screen will be displayed.

This report will display the Parameter names, date of Job/WorkOrder creation, Part no, Workorder no, Machine no, Operator code, Process code, Cp and Cpk or Pp and Ppk. Cp and Cpk or Pp and Ppk will be categorized under three columns - >1.33, 1.33, <1 each.

Cp or Pp column will not be display when the parameter is single sided

13.33 Parameter Cp/Cpk or Pp/Ppk Summary Report

Use this option to generate a Parameter Cp Cpk/Pp Ppk Summary Report that will display the summary of all readings and Cp Cpk or Pp Ppk details for the selected parameter defined in all the Job or work orders created between the specified period.

Click on Report -> Parameter Cpk/Ppk Summary Report menu item. A screen for accepting report Dates will be launched. Specify the required period by entering **Period From and Period To.** Select the required **Parameter** from the parameter list. Select **Cp-Cpk data** or the **Pp-Ppk data** as per the requirement. Click **OK** to confirm the selection and proceed with the generation of report. Click **Cancel** to exit.

If the user had selected Cpk, the report launched will be Parameter Cp-Cpk Summary report with all the readings, Range, Read (+/- 3 Sigma) and Cp-Cpk data for the parameter selected.

Similarly if the user had selected Ppk the report launched will be Parameter Pp-Ppk Summary report with all the readings, Range, Read (+/- 3 Sigma) and Pp-Ppk data for the parameter selected.

13.34 Part Wise Summary Report

Use this option which displays the summary information of each selected part on different sheet and also all the jobs of that part.

Click on **Report -> Part Wise Summary Report** menu item. A screen for accepting report Dates will be launched. Specify the required period by entering **From Date and To Date.**

After selecting date it will display all the parts in list box which has readings for the selected period. Provide the option for Select All. When user clicks on select all then it should check all the Part no from list box. When users uncheck the Select All, that time it will uncheck all parts from the list box. User selects 3 parts and click on OK then it should display the information of each part on different sheet.

13.35 Export Data of Component Number Report

Use this option to generate an **Export Data of Component Number Report** that will display the process wise parameter values for the selected component number.

When component number flag is true then click on **Report -> Export Data of Component Number Report** menu item. A screen for accepting required information will be launched. Select the Component Number, Date, Shift, Part Number & Station Number and then click on **Ok** button to confirm the selection and proceed with the generation of reports.
Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

Report will display company name and report name in the report title. This report will display the selected Component number, Part Number, Date, Station Number and the process wise parameter values for the selected component number.
It displays Machining tracking number instead of Shift in case of g_breaksIndia flag is true.

13.36 Date-Wise Export Data of Component Number Report

Use this option to generate a **Date-Wise Export Data of Component Number Report** that will display the date wise component number with parameter values for the selected period, part number and process.

When component number flag is true then Click on **Report -> Date-Wise Export Data of Component Number Report** menu item. A screen for accepting required information will be launched. Select From Date, To Date, Station No. & Part Number and then click on **Ok** button to confirm the selection and proceed with the generation of reports.
Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

Report will display company name and report name in the report title. This report will display the selected Station number, Part Number, Date & Process and the date wise Component Number with parameter values for the selected period.

If Part Number has three processes, i.e. Component number has gone into three processes then data will be displayed in three different tab. i.e. each process has different tab.
It displays Machining tracking number instead of Shift in case of g_breaksIndia flag is true.

13.37 Corrective Action Trend Report

You may generate a report on **Corrective Action Trend Report** when *Global Monitoring* screen is active. Select the job from one of the above-mentioned screen and

click on **Corrective Action Trend Report** from Report of Main menu. You will get the Date and time dialog box. Select the **Date** and **Time** from respective controls.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Corrective Action Trend* report displays the information about when and which trend was raised for the selected job during the specified period, and the corrective action that was taken for the trend. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.38 Trend V/S Rejection Report

You may generate a "Trend v/s Rejection report" by selecting the job from Local/Global monitoring screen and click on Trend V/S Rejection report from Report menu.

Trend V/S Rejection report shall display the reading of trends of the variable parameter of the selected job.

Select the date, time in the Search Engine Screen and then click on Ok button. If data is not available for the selected date & time then it will display the message as 'No Trends are raised for the parameter(s)'. If data is available for the selected criteria it will launch the Trend V/S Rejection Report.

This report provides when and what trend has been raised, what corrective action has been taken and display readings as:

- When reading is Out of Specs Limit then it will display as rejection. Color will display as Red.
- When Sample has trend then it will display which trend has been raised & if sample is within control limit then color will display as green.
- When sample is out of control limit it will display in Fuchsia color.

13.39 Balance Tool Life

All running Models or closed Models are displayed in the **Models Available** list. You may use selection and de-selection buttons to move these available Models to include in the report. In this report you can see the balance life of the tool.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Balance Tool Life Report* displays the balance life of a tool that has been used or is in use by a Model. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.40 Model Wise Report

All running Models or closed Models are displayed in the **Models Available** list. You may use selection and de-selection buttons to move these available Models to include in the report.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Model Wise Report* displays the detailed information about the tools, its parameters, operating values, and life of the tool for the selected **Model(s)**. The information in this report is displayed Model wise. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.41 Operation Wise Report

All machines, which are manufacturing Models, are displayed in the **Machine Available** list. You may use selection and de-selection buttons to move these available Machines to include in the report.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Operation Wise Report* displays the detailed information about the tools and life of the tool for the selected **Machine(s)**. The information in this report is displayed Operation wise. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.42 Production Report

You may then specify the period by setting **Period from** and **Period to** fields. The **Machine Numbers** are populated in the drop down list for which the production has been done.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. *Production* report gives the details about production of a model for a machine and shift for a specified period. The target shift quantity that is mentioned in the *Model Shift Target* screen is displayed. This assists you in knowing the actual produced quantity and the desired target quantity. Supervisor of each shift is also displayed in the report. Supervisor name is displayed in the color that is specified in the *Supervisor* master. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.43 Tool Parameter Change Report

You may then specify the period by setting **Period from** and **Period to** fields. The **Tool Codes** are populated in the drop down list for which the parameter value has been changed.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. Tool Parameter Change report gives the idea about the life of a tool for a different values of the parameter. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.44 Tool Change Report

You may then specify the period by setting **From** and **To** fields. If the tool has been changed within the specified date i.e. **From** and **To** fields, then the reports can be launched.
Click on the **OK** button to confirm the selection and proceed with the generation of reports. Tool change report will gives the idea about when the tool was changed and the reason for the same. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

13.45 Production Report

You may then specify the period by setting **From** and **To** fields. Click on the **OK** button to confirm the selection and proceed with the generation of reports.

Production report displays detail information for Production Quantity, Rejection Quantity for part and machine for the selected period. Click on **Cancel** to leave this dialog without making any modifications or to cancel the operation.

If data is present for the selected period report will be displayed. If records are not present then system display message No records found. First group will be on Machine no and second group will be on part no. Group wise total will be calculated and printed after completion of each group. Grand total will be printed at the end of report.