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Part I: CIM in your factory

This part explains the architecture of the complete CERSA offer for your production line, the only way for the: “full inline quality certification”.

Our offer integrates:

- Measurement instruments for fiber optics:
  - LIS-G for Glass fiber diameter, spinning, non-circularity measurement and defect detection (including airline).
  - NCTM for Glass fiber drawing tension measurement.
  - CM5 for Coated fiber diameter, asymmetry measurement, and Lump & Neck detection.
- Production software:
  - C.I.M. software (CERSA Instruments Manager) is a PC environment that manage all CERSA-MCI instruments. It provides a complete set of comprehensive tools to improve and master the production process as well as all features to certify the whole production specifications in line.

**Main features**

- Monitoring the process in real time.
- Data logging.
- Production reports (Statistics).
- Instruments configuration.
1 Architecture
Cersa instruments are located at different positions of your production line. They measure all the critical parameters for your process. CIM connects all the line's instruments together (connexion), in order to have a global graphical view of all these parameters in real time.

CIM can also centralize several external voltage signals like furnace temperature, coating pressure, speed, in order to show those measures in the same charts as CERSA measures. These external signals need to use an analog to digital converter (ADC). (This functionality is not yet available).

However, all the instruments need to have a synchronization with your process. Using your reset and length counting signals each instrument have the capability to locate all defects accurately with the same reference as your process control system. Thus CIM interface gives the necessary information to help the user in the product rejection process. Your process control system can access to some critical parameters directly using instruments BNC outputs.

Our customers have the capability to define specifications for each product used in their factory (CIM_PRODUCT database). These specifications can be global to the factory or specific to several lines. In this way an external database order or manual operator action can order the production in lines resulting in an automatic configuration of tolerances and specifications to the instruments.

All the results of your production can be stored spool by spool in distant or local database (CIM_REPORT database). This report can be global to the factory or specific to several lines. Thus our customers have all necessary information to qualify and certify whole spools.

In addition to these data logging functions, you can save your production in CIM proprietary file. These file store the full information for your batch production. Statistical reports can be generated.

All the tools included in CIM software help the process engineer and operators to master the relations of causes and effects between all the measured parameters. It is a global solution for supervision, data logging and quality reports.
2 Production management

The chart-flow above presents the production management used by CIM software in order to make the following actions:

- Database report.
- Configure instrument tolerances.
- Configure batch name and product type.
- Save batch data in file.
- Reset CIM display.
3 Supervisor

*Under development*

The CIM supervisor is a PC software that communicates with all production lines. It summarizes in real time the basic information for each line. It gives you the capability to supervise all your lines from desk.

Using this software hosted on one PC, you will be able to watch in real time the status of the whole production. You access to all data that are hosted by the child’s PCs. You also are able to watch the details, like real time charts line by line. You can see the previous production using a browser that helps you to select the records by date.
4 Required PC specifications

The minimum requirements are defined below:

- Windows XP service pack 2 has been validated. Windows seven is under validation.
- 2 GB RAM.
- Dual core processor 2GHz.
- 250 Gb hard disc with high speed access.
- Graphical card with 256 MB ram.
- 1280x1024 Screen. (Lower resolutions will reduce the ergonomics)
- 1 RS232 serial link port for each connected instrument.

Remarks:
- If your computer doesn't have RS232 port, you can use additional internal boards (USB to RS232 converters are not recommended).
- CIM interface is completely compatible with touch screen displays.
- CIM is compiled for 32-bits target. The 64-bits target is not validated yet.
- If you use data logging, configure network and user permissions of path containing central databases.
5 Quick start

The following steps will assist you in the setup of global CERSA offer in your factory.

Install instruments *(See instrument manual for more details)*

- Fix the instruments in line.
- Plug in air supply for the instrument if necessary.
- Connects digital input output instrument interface with your process control system.
- Connects BNC analog outputs with your process control system.
- Connects RS232 instrument interface with the PC.
- Keep in mind the PC COM port used for every instrument.
- Plug in power supply for the instrument.

Install CIM

Your instrument has been delivered with CERSA-MCI CD-ROM including the CIM Setup file. When you insert your CD-ROM in your drive, an automatic setup is launched.

Remark:

- If the setup is not launched automatically you need to launch the setup manually from your drive at the following location: Drive:\CIM\setup.exe

Follow step by step the setup procedure displayed on the screen.

Protection key

Plug in the USB protection dongle to benefit the full production features. Refer to key protection.

Configure CIM

- Launch CIM software.
- Enter the "supervisor" password.
- Add your connexions (CERSA instruments) in the connexions manager interface.
- Configure the name of your line, database and data logging options in lines manager interface.
- Define your products specifications in lines manager interface.
Part II: Interface

The main control panel is the first interface displayed when you launch CIM software. It contains global functions to manage your production, configure the software and read recorded data. These functions are displayed according to the access level of the current user. Thus the basic production functions are available for the operators but advanced configuration functions are available only for supervisors.

See password topic for more information about user access level.

Main control panel

It can be accessible from other panels by click on the following icon:

Main control panel button
1 Main

Main panel button

By clicking on the main button, user has access to production lines controlled by the software.

Main panel

This panel is available when at least one connexion has been added with connexion manager interface. The right side of this interface display real time information in "Lite view" tab (for main measures) and in "Full view" tab for the whole measures. Thus for each line are displayed the following zones allowing the user to manage the line production:

- Line informations.
- Connexions.
- Measures and events.
- Position target (Only in lite view).
- Production.
- Explorer.
- Scope manager (accessible only with supervisor level).
- Measure manager (accessible only with supervisor level).
- Parameters manager (accessible only with supervisor level).

At the bottom of the main screen, the control panel button display multiple functions specifics for each zone.

Control panel button
1.1 Line informations

**Production status**

Gives the status of the line production.

*Production On:* the conditions to begin the production are met refer to Lines manager.

*Production Off:* at least one condition is not respected.

**Batch name**

The name of the produced batch or preform.

**Product name**

The kind of product that is currently produced. Product specifications are defined in Lines manager interface.
1.2 Connexions

Connexions table

This table displays the status for each connexion belonging to the line. The first column display connexion names linking the instrument name and serial number. The second column display short name for the instrument error codes. Refer to the instrument manuals for more information about error codes. The third column displays icon which represents the status of the connexion.

Connexion status icons

The status of connexion is defined by the following list:

- **Connexion run icon**: The connexion is running without problem.
- **Connexion break icon**: The main communication is not enabled for this connexion.
- **Connexion identification icon**: CIM identifies connexion.
- **Connexion reconfiguration icon**: CIM reconfigures several parameters in connexion.
- **Connexion clear events icon**: CIM clears events in instruments.
- **Connexion reset line icon**: Connexion has been reset in order to reset line.
- **Connexion disconnected icon**: Connexion is disconnected.
- **Connexion start stop error icon**: Problem to start or stop COM port.
Part II: Interface

Main

Connexion process icon: The connexion processes parameters.

Connexion comm error icon: Communication error.

Connexion compreg error icon: This error appears when the user changes parameter and the requested value is not the same as the value stored by the instrument.

Warning icon: The instrument sends an error code.
1.3 Measures and events

This table shows in real time all the measures and related events of the instruments belonging to the line. When out of tolerance is detected in measure an event is reported in third column of this table.

### Out of high tolerance icon.

### Out of low tolerance icon.

The display refresh time of this table is about one second. The name of each measure can be set in measures manager and it is prefixed by connexion prefix defined in connexion manager.

**Remark about events:**

It is a particular phenomenon that is detected by the instrument. Events are detected in real time by the measurement system, it is dated and located (length). It is also characterized in term of extremum value.

Here below is an example of high speed diameter fluctuation which exceeds the tolerances.
1.4 Position target

This graph displays the position of the customer product when position X-Y measures are transmitted by the instrument.

Please refer to the instrument manual for the instrument alignment.
1.5 Production

*Production zone*

In order to study in detail your production, this interface gives you the possibility to manage each measure independently of others.

The events generated by the instruments are located independently for each measure. They are positioned with high precision according to the time or length.

When the production zone is displayed the control panel shows the following functions:
1.5.1 Measures graph

On this graph are drawn continuously the measures coming from the instruments belonging to the line. The display refresh time of the measures is about one second.

Because CIM displays information for complete batch, the original displayed data and resolution can change over the time in order to preserve processor resources. The original information is stored in internal file and can be restored with explorer functions.

All the line measures displayed in this graph are overlapped, but the displaying scale for each measure can be managed independently. The Y axis of each measure can be displayed in the left part of the graph.

\[
\begin{align*}
126.000^- & \quad \text{Current Y axis} \\
125.500^- & \\
125.000^- & \\
124.500^- & \\
124.000^- & \\
\end{align*}
\]

Min and max correspond to the minimal and maximal values of the measures graph. They are computed with amplitude and offset fields:

<table>
<thead>
<tr>
<th>Minimal value</th>
<th>Offset - (Amplitude / 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximal value</td>
<td>Offset + (Amplitude / 2)</td>
</tr>
</tbody>
</table>
Part II: Interface

Main

Amplitude and offset fields

To change the default values of the amplitude and offset for each measure, please refer to measures manager zone. To temporary change the amplitude and offset values of each measure, please use graph settings button in control panel.

Graph settings button

Graph settings button displays the following interface panel. It can be also launched by right click in current Y axis and in measures axis table.
Graph settings panel

This panel allows the user to modify settings for specific measure. All these changes can be restored to the default settings defined in measures manager interface.

To choose the measure to modify, click or touch the corresponding cell in the measures axis table. For each measure the following settings are available:

**Y zoom**

![Y zoom button]

Push this button to activate Y zoom functionalities. When Y zoom is active Y offset function is automatically deactivated. To make "zoom in" of related measure slide up your finger (or click and slide with mouse cursor) in Y axis. To make "zoom out" slide down your finger.

**Y offset**

![Y offset button]

Push this button to activate Y offset function. When Y offset is active Y zoom function is automatically deactivated. To change the offset of related measure slide up your finger (or click and slide with mouse cursor) in Y axis.

**Amplitude**

This numeric control allows the user to enter a value for amplitude of measure. This action is equivalent to Y zoom function.

**Offset**
This numeric control allows the user to enter a value for offset of measure. This action is equivalent to Y offset function.

**Display**

Allows the user to display or not measure in measures graph. When the measure is not displayed, the label text for this measure appears with strikeout text.

![Not displayed / displayed icons](image)

**Restore measure**

Restore default settings for selected measure in terms of amplitude and offset.

**Restore all**

This function restores the settings for all measures displayed in the measures graph.

### 1.5.2 Events graph

On this graph are displayed in real time the events coming from the instruments belonging to the line.

Two types of events are displayed in this graph:

- Segment event is used to display measure out of tolerances.
- Point event is used to notify instrument alarms.

These events are displayed with the real duration and length. Refer to Measures and events topic for more details.

Because CIM displays information for complete batch, the original displayed data and resolution change over the time in order to preserve processor resources. The original information is stored in internal file and can be restored with explorer functions.

To define the position for events displayed in this graph please refer to measures manager.
1.5.3  X axis

The X axis is the reference axis used by measures graph and events graph for displaying. It can be vertical moved with the X axis scroll button, this action resizes the measures graph and the events graph zones.

X axis scroll button

In order to change the references and the mode of this axis you can click in reference settings button or right click in the X axis. This action displays the reference settings panel.

Reference settings panel

The following popup menu will appear by pressing X mode menu.

X mode menu

Two displaying modes are available.

Automatic mode

The whole batch is displayed in the graphs.

Current mode

Displays the last n minutes or meters. n is adjustable by the following actions:

- Slide right over the X axis to decrease the amount of displayed data.
- Slide left over the X axis to increase the amount of displayed data.
- By changing the value in the “current interval” interface.
The selected mode is displayed in the X mode text box.

The following popup menu will appear by pressing X reference menu.

Four references are available:

- **Absolute PC time**: displayed in hours:minutes:seconds day/month/year format. This time is dated by the computer.
- **Relative PC time**: elapsed time since the begin of the batch displayed in hours:minutes:seconds format. This time is dated by the computer.
- **Batch time**: elapsed time since the begin of the batch displayed in hours:minutes:seconds format. This time is dated by the instruments.
- **Batch length**: produced length since the begin of the batch displayed in meters. This length is computed by the instruments.

We strongly recommend to use batch length mode. This mode needs reset and length counting signals.

The selected reference is displayed in the X reference text box.

The restore button action comes back to default settings defined in line manager interface.
1.5.4 X selection

Push this button in the control panel to enable or disable the X selection function.

When the X selection function is enabled spool selection is deactivated and the user can make selection by clicking twice in measures graph.

- The first click defines the start point of selection and displays a blue line.
- The second click defines the stop point and display grayed zone.
- This grayed zone represents the selection.

1.5.5 Spool selection

Push this button in the control panel to enable or disable the spool selection function.

When the spool selection function is enabled X selection function is deactivated and the user can make spool selection by clicking in measures graph.

- The spool number is displayed by left clicking or touching the graph in related spool zone.
- The spool number is refreshed if the user holds the finger or the mouse button while sliding.
- When the user releases the button or the screen the spool zone is automatic selected.
Part II: Interface

Main

This functionality is necessary to explore, save in files and make reports of sections in your production

1.5.6 Save selection

Push save selection button to record data selection in file.

The user can choose the file name and target directory. The preview field displays the final path.

The extension of this kind of file is ".cimprd". The recorded file can be opened with load function
located in main control panel.

### 1.5.7 Selection report

![Selection report button](image)

Push selection report button in the control panel to display a report of your selection.

#### Report selection example

The report interface has four zones:

**Informations**

This table contains general informations about selection.

#### Informations zone

- **Spool**: spool number to which the selection belongs.
- **Length**: length of selection in meters.
- **Start date time**: the start time of selection in Year-Month-Day Hours:Minutes:Seconds format.
- **Stop date time**: the stop time of selection in Year-Month-Day Hours:Minutes:Seconds format.
- **Product name**: the name of product defined in line manager with product specification interface.
- **Line name**: the name of the line in which selection was made.
- **Batch name**: the name of the batch in which selection was made.
Statistics

This table shows for each measure:

- **Measure name**: the unit of measure is indicated in brackets.
- **Error**: percentage of wrong measures in selection for every type of measure.
- **Cp and Cpk**: process capability:
  \[
  \text{Cp} = \frac{\text{USL} - \text{LSL}}{6 \times \sigma}
  \]
  \[
  \text{Cpk} = \frac{\text{Cp}}{3} = \frac{|m - \mu|}{3 \times \sigma}
  \]
  \(m = \text{Nominal value.}
  \text{USL} = \text{Upper set limit. Related to the high tolerance.}
  \text{LSL} = \text{Lower set limit. Related to the low tolerance.}
  \mu = \text{Average.}
  \sigma = \text{Standard deviation.}
  \]
- **Average**:
  \[
  \mu = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i
  \]
  \(x_i = \text{Data set.}
  n = \text{number of measures.}
  \]
- **Standard deviation**:
  \[
  \sigma = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (x_i - \mu)^2}
  \]
- **Minimal value**: minimal value in selection.
- **Maximal value**: maximal value of selection.
- **Remark**:
  - A measure is considered as wrong when it is out of tolerances or when an instrument alarm
Events

**Events tab**

Shown in this table is the number of cumulated events found in the selection. For each measure are indicated:

- **Event**: the name of the related measure. The unit of event is indicated in brackets.
- **Event type**: out of "high tolerance" or out of "low tolerance".
- **Number of events**.

**Event detail**

**Event detail tab**

This table contains the detail for each event found in selection.
- **Event**: name of the related measure. The unit of event is indicated in brackets.
- **Event type**: out of high tolerance or out of low tolerance.
- **Extremum value**: if high tolerance this value represents the maximum value of the event. If low tolerance this value represents the minimum value of the event.
- **Spool time**: the time when the event occurred. This time is relative to the beginning of the spool.
- **Duration**: the duration of event in seconds.
- **Spool position**: the position of the event in meters. This position is relative to the beginning of the spool.
- **Length**: the length of event in meters.

All these tables can be printed to make paper reports by click on print button.

![Print button](Print button)

The "select print settings window" allows the user to select regions to print and the printer to use.

![Select print settings window](Select print settings window)

The following regions can be selected:

- **Explorer panel**.
- **General information table**.
- **Statistics table**.
- Events table.
- Event detail table.

## 1.5.8 Production controls

### Production controls button

Press this button in the control panel to display the production controls.

![Production controls panel](image)

### Production controls panel

#### Reset

![Reset button](image)

This button performs a general reset for the current batch produced in corresponding line. This action deletes all measures, events and spool information. It is not available when production is started. See Lines manager chapter for more details about production.

#### Change spool

![Change spool button](image)

Press change spool button to send reset order for all instruments belonging to the line. Spool reset is represented by a vertical green line in production zone.
Reset line in production graphs

This action is only available when production is started. See Lines manager chapter for more details about production.

Set batch

Set batch button

By pressing this button the "New production selection" interface appears. This interface allows the user to enter batch name and the type of product. Product configuration is defined in lines manager interface.

New production panel

Force start prod
Force start production button

This action forces start production even if start conditions are not respected. See more details about start conditions in lines manager chapter.

Force stop prod

Force stop production button

This action forces stop production even if stop conditions are not respected. When production is ended CIM will scan order of production to initialize production (only in external product configuration). See more details about stop conditions in lines manager chapter.
1.6 Explorer

Explorer zone

This interface is automatically displayed when a valid selection is defined and the user clicks on the explorer button. It is useful to analyse specific part of your production.

Explorer button

CIM restores original data corresponding to the selection and displays automatically the information in this interface. All the displayed measures and events can be tracked with cursors in order to give the detail of your production.

When the selection is too large the resolution status zone displays "Low resolution" message. In order to display the data with full resolution the user can override the selection with X selection and Explorer buttons. The user can come back to original selection using the restore selection button.

Restore selection button

Save selection, Selection report, Graph settings and Reference settings can be used in the same way as explained in Production chapter.

When the explorer zone is displayed the control panel shows the following functions

Explorer control panel
### 1.6.1 Measures graph

In this graph are displayed the measures of the selection. The settings for each measure can be managed in the same way as in production measures graph with the graph settings button.

To track the measures the user can touch or click on this graph. The measures table shows the measures corresponding to the relative reference position of the vertical cursor.

#### Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>G Spool number</td>
<td>0</td>
</tr>
<tr>
<td>G Spool time [h:m:s]</td>
<td>00:03:16</td>
</tr>
<tr>
<td>G Spool length [m]</td>
<td>0</td>
</tr>
<tr>
<td>G Diameter [μm]</td>
<td>126.350</td>
</tr>
<tr>
<td>G Non Circ. [μm]</td>
<td>0.758</td>
</tr>
<tr>
<td>G Spinning to [tr/a]</td>
<td>224.200</td>
</tr>
<tr>
<td>G X position [mm]</td>
<td>0.090</td>
</tr>
<tr>
<td>G Y position [mm]</td>
<td>0.330</td>
</tr>
<tr>
<td>G Speed m/min [m/min]</td>
<td>0.000</td>
</tr>
<tr>
<td>G Inv. period [s]</td>
<td>0.553</td>
</tr>
<tr>
<td>G Spin. time unb. [%]</td>
<td>10.840</td>
</tr>
<tr>
<td>G Spin. freq. unb. [%]</td>
<td>8.520</td>
</tr>
<tr>
<td>G Spin. turns. unb. [%]</td>
<td>2.150</td>
</tr>
</tbody>
</table>

#### Measures table

The values of this table remain unchanged while the cursor did not snap on another measure.
1.6.2 Events graph

In this graph are displayed the events corresponding to the selection. To display the details for a specific event, click or touch the event on the graph. Then the cross cursor will snap at line start on the nearest event. The details are displayed in the event detail table.

When the selection does not contain the event start, stop or when the resolution of the selection is not sufficient, the event table displays "unavailable".

**Event detail table**

The following informations are listed:

- **Instrument type and serial number**: is the connexion identifier of instrument that sends the event to CIM.
- **Event name and event type**: the name of the measure in which the event occurs. Event type displays out of tolerances or alarms. See production events graph topic for more details.
- **Argument start**: used only for CERSA-MCI test configuration.
- **Argument stop**: for out of tolerances events, the argument corresponds to the extremal value. For status events it gives an additional internal information.
- **Spool**: the spool number in which the event was located.
- **Spool time**: the time in Hours:Minutes:Seconds format when the event occurs from the beginning of the spool.
- **Duration**: the duration of event in seconds. (Only for out of tolerances events. See production events graph topic).
- **Spool position**: the event position in meters from the beginning of the spool.
- **Length**: the length of event in meters. (Only for out of tolerances events. See production events graph topic).
- **PC time**: time on which event occurs dated by PC in Hours:Minutes:Seconds format.
- **Batch time**: the time in Hours:Minutes:Seconds format when the event occurs from the beginning of the batch.
- **Batch position**: the event position in meters from the beginning of the batch.

Please refer to your instrument manual to have the list of events and their description.
1.6.3 X axis

The X axis is the reference axis used by measures graph and events graph. The X reference can be selected in control panel with X reference button. See more details about references in production X axis.

X reference button

The explorer X axis can be sliding at right to "X zoom in" around the vertical cursor and left to "X zoom out" around the vertical cursor.

1.6.4 Cursors

Vertical cursor

This cursor allows to track measures in order to display information in explorer measures table.

Click on the measures graph and slide cursor to track the measures. The cursor snaps on the nearest measure when is released. The vertical cursor is displayed also in events graph to show correlation between events and measures but it can not be controlled by clicking in explorer events graph.

This cursor is used also to give reference to makes X zoom function (See explorer X axis topic for more details). When the user make "X zoom in" or X zoom out" the data is first refocused around the vertical cursor and then zoomed at the position of cursor.

Cross cursor

This cursor allows to track events displaying information in explorer event detail table.

Click on events graph as nearest as possible of event, to make the cursor snap on it. Because events can be positioned by CIM with very high precision, several events can be displayed closer. We recommend to use zoom function to place cursor with more precision.
1.7 Scope manager

Scope manager zone gives the capability to make the acquisition of CERSA instruments internal signals and displaying it in scope interface. User can add several scopes interfaces in order to make correlations between signals.

To add scope interface push add button in control panel. Then the following interface is displayed:

Each scope interface can display several synchronous signals in different channels and/or in different graphs.
Scope signals in multiple graphs

Scope cursors are available and help the user to manage the displaying. Full screen mode can be activate or deactivate by right click in desired graph.

When the scope manager zone is displayed the control panel shows the following functions

1.7.1 Add scope
This button adds scope interface in scope manager zone. The new scope is positioned just after the last added scope.

### 1.7.2 Select signal

This ring control shows the available signals for instruments belonging the line. The list here below shows several examples:

- CCD diffraction
- Real time diameter interferometry
- Real time tension
- Spinning evolution
- Vibration FFT

For more details about configuration of signals please refer to instrument manuals.

### 1.7.3 Signal tab

In this tab are displayed result controls (blue color) and parameters controls (green color) to configure signals correlated with scopes. Parameter controls can be adjusted only when scope acquisition is stopped otherwise controls are dimmed.
1.7.4 Process tab

In this tab user can select the signal processing to apply over the signal. Export to BMP button is active only for two dimensional signals.

Signal is displayed in blue color and the signal process is displayed in red color. Here below is show one example of scope with FFT signal processing.

Scope “FFT diameter airline” example with FFT signal processing
1.7.5 Scale tab

This tab allows the user to change the scale mode of X and Y axis.

Three scales modes are available for each axis:

- **Default**: the instrument chooses the scale to display.
- **Automatic**: CIM seeks minimal and maximal values and displays the signal regarding these values.
- **Manual**: user can change manually the minimal and maximal values for each axis.
1.7.6 Display tab

In this tab the user can manage channels and cursors related to the scope.

The number of channels and cursors are defined by the instrument.

Two display modes are available:

- **Default**: The instrument chooses the channels, cursors and colors for displaying.
- **Manual**: The user can choose the channels, cursors and colors for displaying.

The cross cursor legend displays the X and Y position of the cursor related to the graph scale. This cursor also gives the value of the nearest point related to the selected channel.
1.7.7  Delete scope

This button deletes the scope interface.

1.7.8  Start stop scope

This button starts and stops acquisition of signals from the instrument. To configure the scope, you first have to stop the acquisition.

When you quit the scope manager zone, the acquisition of all scopes are automatically stopped. The acquisition will be restarted when you come back to the scope manager zone.

1.7.9  Refresh time

This parameter defines the acquisition and display period expressed in seconds. The recommended value for this parameter is one second. Smaller values can be applied to this parameter but this action will use more resources.

1.7.10 Save scopes

By pushing this button, the user will be able to store in one single file all scope interfaces displayed in scope manager zone. The following interface will appear to locate and name the file.
Save file panel

The extension of this kind of file is ".cimscp". The recorded file can be open with load function located in main control panel.

1.7.11 Save sequences

Scope save sequence button

With this function you will be able to save sequence of displayed signals during a time period in one single file. You must enter the number of seconds that you want to record in the following interface.

Save sequence panel

Then the recording will run automatically. The following interface will appear at the end of record to locate and name the file.
CERSA can request you to send several signals in one single file to have a good statistic view of your process. This kind of tool is necessary in order to help you for advanced settings and improve your measurement.

The extension of this kind of file is ".cimscp". The recorded file can be open with load function located in main control panel.
1.8 Measures manager

This interface gives the possibility to transmit (RS232 communication), display and configure measures and events from the instruments belonging to the line. All available measures for each instrument are displayed in "select transmitted measures" table.

The following icons define the status of the measure:

- **The selected measure or event is always transmitted. User cannot delete or add from current configuration.**
- **The selected measure or event is transmitted.**
The selected measure or event is not transmitted.

Any change in the user configuration requires a reset in the line. The following message appears to prevent the user that all the data will be lost:

Reset line message

Add measure

Add measure button

Add the selected measure to the current user configuration.

Delete measure

Delete measure button

Delete selected measure from current user configuration.
1.8.1 Settings tab

When the user selects a transmitted measure, this interface displays its settings and gives the possibility to change the current configuration. When a non transmitted measure is selected this interface is dimmed.

The following settings are displayed:

**Default name**

Is the default CERSA name followed by the serial number of the instrument. This default name cannot be duplicated and is located at the top left of the settings tab interface.

**General settings**

- **Name**: This control displays and gives the possibility to change the user measure name. This name will be used in all the software interface.
- **Color**: This control displays and gives the possibility to change the user measure color. This color will be used in all the software interface.
- **Display**: This control displays or hides the measure (and measure event if exist) in measures graph, measures axis table, measures table and events graph.
Part II: Interface

Main

Not displayed / displayed icons

Measures graph settings

- **Amplitude**: Defines the default amplitude.
- **Offset**: Defines the default offset. The default configuration can be restored from graph settings window.
- **Display**: This control displays or hides the measure in measures graph and measures axis table.
- **Left and Right**: These controls change the position in the measures axis table.

Measures table settings

**Up and Down**: These controls change the position in the measures table.

Events settings

**Up and Down**: These controls change the position in the events graph.
1.8.2 Mix measure tab

This interface will add or delete measure that will be computed using existent transmitted measures. This capability is called "Mix measure".

To mix measures follow the next steps:

- Select function to compute the new mix measure from the following list.

\[
kaA + kb \quad kaA - kbB \quad \sqrt{kaA^2 + kbB^2}
\]
• Choose A and B measure by pressing, drag and drop from transmitted measures.

Add measure to mix

• Enter coefficients when the function uses these coefficients.
• Finally add mix measure with the following button:

Add mix measure button

• To delete mix measure select the measure and click on delete mix measure button.

Delete mix measure button
1.9 Parameters manager

Parameters manager gives for each instrument belonging to the line the following interface structure:

- Tolerances & Detection
- Analog interface
- Digital interface
- Measure
- Informations

1.9.1 Tolerances & Detection

This interface allows user to configure tolerances and detection parameters of instruments. Each measure or detection feature displays their tolerances in individual subregion tab. When the measurement value is outside the range, defined by the tolerances, the instrument generates an event. These events are displayed in events graph.

The following configurations can generate events:

<table>
<thead>
<tr>
<th>Measure comparison</th>
<th>Event description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure &gt; Nominal tolerance + Warning high tolerance</td>
<td>EVENT WARNING HIGH (Not available yet)</td>
</tr>
<tr>
<td>Measure &lt; Nominal tolerance - Warning low tolerance</td>
<td>EVENT WARNING LOW (Not available yet)</td>
</tr>
<tr>
<td>Measure &gt; Nominal tolerance + Out high tolerance</td>
<td>EVENT OUT HIGH</td>
</tr>
<tr>
<td>Measure &lt; Nominal tolerance - Out low tolerance</td>
<td>EVENT OUT LOW</td>
</tr>
</tbody>
</table>

Please refer to the instrument manual for more details about configuration of tolerances.
1.9.2 Analog interface

The following parameters configure the analog outputs of the instrument.

- **Configuration**: defines electrical type configuration of analog output. Please contact CERSA-MCI for more details about this parameter.
- **Measure**: defines the forwarded measure in analog output.
- **Zero point**: when the measured value reaches the zero point value, the corresponding analogical output is set to 0V. The unit of the zero point is the same as the corresponding measure.
- **Scale**: is the number of volts per measure unit. For example for position in millimeters 2 [V/mm]: if the measure varies of 1mm the value of analog output varies of 2 Volt.
- **Regulation**: if this option is activated, then the zero point value is automatically forced to the nominal tolerance value of the corresponding measure. Otherwise the zero point can have any value.
- **Average time**: is the average time used to compute the analog output signal.
1.9.3 Digital interface

This tab contains two subregions in order to configure the digital interface of the instruments.

**Digital input/outputs**

This subregion allows user to configure input/outputs signals. The following configurations are generally used to give or receive a reference, event, alarm or status:

- UNAVAILABLE (not exist in the current instrument)
- INPUT
- OUTPUT
- INPUT OUTPUT
- REFERENCE

**Length counting**

- **Pulse number**: the number of pulses for one meter length.
- **Measure**: in case of the real speed and the measured speed are not perfectly correlated, you can adjust this factor.

Please refer to the instrument manual for more details about configuration of digital input/outputs.
1.9.4 Measure

This interface displays all parameters relative to the measure of the instrument. Each measure displays its parameters in individual subregion tab.

Please refer to the instrument manual for more details about specific instrument measure parameters.
1.9.5  Informations

In this tab are displayed all informations relative to the general instrument configuration: Internal software versions, hardware versions and safe internal information. These informations can be requested by CERSA-MCI for assistance.
2 Password

The following interface is used to change the access level of the current user:

To change your access level, enter directly the corresponding password and click on apply button. To close this panel and return to main controls, click on main controls button.

**Remark:**

- For touch screen users: when you click in control to be filled, the touchpad interface appears automatically.

Two levels are available for customers purposes:

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>DEFAULT PASSWORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>user</td>
<td>user</td>
</tr>
<tr>
<td>supervisor</td>
<td>supervisor</td>
</tr>
</tbody>
</table>

To change default password please use the change password interface located in preferences panel.

The following functions uses this access level:

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main panel</td>
<td>user</td>
</tr>
<tr>
<td>Password</td>
<td>user</td>
</tr>
<tr>
<td>Load file</td>
<td>user</td>
</tr>
<tr>
<td>Key protection</td>
<td>user</td>
</tr>
<tr>
<td>About</td>
<td>user</td>
</tr>
<tr>
<td>Toolbox</td>
<td>supervisor</td>
</tr>
<tr>
<td>Preferences</td>
<td>supervisor</td>
</tr>
<tr>
<td>Connexions manager</td>
<td>supervisor</td>
</tr>
<tr>
<td>Lines manager</td>
<td>supervisor</td>
</tr>
<tr>
<td>Production</td>
<td>user</td>
</tr>
<tr>
<td>Explorer</td>
<td>user</td>
</tr>
<tr>
<td>Scopes manager</td>
<td>user</td>
</tr>
<tr>
<td>Parameters manager</td>
<td>user</td>
</tr>
<tr>
<td>Parameters manager tolerances detection</td>
<td>user</td>
</tr>
<tr>
<td>Parameters manager analog interface</td>
<td>supervisor</td>
</tr>
<tr>
<td>Parameters manager digital interface</td>
<td>supervisor</td>
</tr>
</tbody>
</table>
### Parameters manager

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>measure</td>
<td>supervisor</td>
</tr>
<tr>
<td>information</td>
<td>supervisor</td>
</tr>
</tbody>
</table>
3 Load

Load file button

This function loads files that were created in production or in scopes. The following extensions are recognized by the software:

<table>
<thead>
<tr>
<th>Extension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.cimprd</td>
<td>Created in production interface using save selection function. Or created automatically when cim data file record option is active in line manager.</td>
</tr>
<tr>
<td>.cimscp</td>
<td>Created using scope manager interface with save scopes or save sequence functions</td>
</tr>
<tr>
<td>.cimzip</td>
<td>This file represents compressed data for production or scopes. Use preferences interface to enable or disable this function.</td>
</tr>
</tbody>
</table>

Several files can be opened at the same time and the production runs simultaneously. Here below some examples of opened files.
3.1 Production files

In the production file the following functions are available in the same way than in production interface:

- X selection
- Spool selection
- Explorer
- Save selection
- Selection report
- Graph settings
- Reference settings

A lite measures manager interface is available in order to select measures and events to display.
"Display all" button displays all the measures and events available in the file. The button can take the following states:

- **All the measures and events are displayed**
- **Several measures or events are displayed.**
- **All the measures and events are hidden.**
“Display measure” button displays the selected measure or event in the graphs and in the explorer table.

The measure and event are displayed in graphs and in the explorer table.

The measure and event are hidden.

“Display graph” button hide the selected measure in the graph. The associated event and explorer table fields remain displayed.

The measure is displayed in the graph.

The measure is hidden in the graph.
3.2 Scope files

*Scope file opened with load function*

In this scope file the next signal, previous signal and go to signal buttons are available to navigate in recorded signals. See save scopes and save sequence buttons for more details about save functions.

*Previous and Next signal button*

*Go to signal control*
4 Key protection

The following interface appears to manage the protection dongle:

Select update file: this button display "select file window". Choose the file sent by CERSA to update the key software.
Main controls: return to main controls window.
Owner: short name of the customer.
Key version: key version for protected software. If a new paid version exist, this version number will be incremented.
Key serial number: internal serial number.
Key configuration: indicate if the key configuration has been properly loaded.

To benefit the full production features, you must own a license and dongle. Contact CERSA-MCI sales service.

CIM in light mode:

If you use CIM without dongle the software will run in light mode. The software will have the following limitations:

- X axis is locked to current mode with only 10 minutes display.
- Automatic data logging is disabled.
- Database report and product specifications are disabled.
5 About

About CIM button

Click on this button to display company information, software version and help contents.

By click in display manual button the following window will appears:

Display manuals button

Select manual window

To open manual in html format select item and make double left click or push in validate button.

Validate button

CERSA-MCI support propose web based meetings for assistance. Please push on support button to open web page with necessary tools to contact us.

Support button
6 Toolbox

Toolbox interfaces are individual CIM modules that allow the user to perform different actions. When the user click on this button the toolbox panel shows the following toolboxes:

- Export to CSV.
6.1 Export to CSV

This toolbox allows the user to export production and scope files to CSV file format (Comma Separated Values). These functionalities can be useful to study in detail your production and make post processing in your spreadsheet preferred application.

The following interface appears when the user click on export to CSV button.

The user needs first to load file to export with "Load button" and then filter data with "type control".
Toolbox

Type control

- For production files measures or events can be selected for export. They need to be exported in different files.
- For scopes files "type control" is hidden and the table shows available scopes in file.

To make export the user needs to select items with check button or by left clicking in item check box. To export data in CSV file you need to click in export button. Then file select pop up appears to ask the name and location of the file to save.

Measure export

Export arrange measure values by columns. Measure 1, Measure 2, ...., Measure N

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC Time [h:m:s]</td>
<td>Diameter [μm]</td>
</tr>
<tr>
<td>11:25:22</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:23</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:24</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:25</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:26</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:27</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:28</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:29</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:30</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:31</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:32</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:33</td>
<td>1,25E+02</td>
</tr>
<tr>
<td>11:25:34</td>
<td>1,25E+02</td>
</tr>
</tbody>
</table>

Measures export

Event export

Export arrange events by rows. For each event the following fields are specified:

- Event type: start or stop out of high/low tolerances.
- Event type name: the name of event in interface.
- Argument: for out of tolerances events, the argument corresponds to the extrema value.
- PC time [hour:minutes:seconds]: time on which event occurs dated by PC relative to the beginning of the batch.
- Batch time [seconds]: the time when the event occurs from the beginning of the batch.
- Batch position [meters]: the event position from the beginning of the batch.
- Spool: the spool number in which the event was located.
- Spool time [seconds]: the time when the event occurs from the beginning of the spool.
- Spool position [meters]: the event position from the beginning of the spool.
Scope export

The exported file contains:

- **Parameters** related to the scope.
- **Results** related to the scope.
- **Scope signals**: (X axis signal 1, Y axis signal 1), (X axis signal 2, Y axis signal 2), ..., (X axis signal N, Y axis signal N). For more details about scope structures please read scope manager chapter.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Min window [μm]</td>
<td>3,58E+01</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Max window [μm]</td>
<td>4,58E+02</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Min peak energy</td>
<td>1,28E+02</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>FFT DC energy</td>
<td>1,44E+04</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>FFT peak energy</td>
<td>7,07E+02</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Diameter [μm]</td>
<td>1,26E+02</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Airline peak level</td>
<td>2,00E+00</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Diameter [μm]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>0,00E+00</td>
<td>2,55E+02</td>
<td>0,00E+00</td>
</tr>
<tr>
<td>12</td>
<td>1,79E+00</td>
<td>2,55E+02</td>
<td>1,00E+00</td>
</tr>
<tr>
<td>13</td>
<td>3,58E+00</td>
<td>9,30E+01</td>
<td>2,00E+00</td>
</tr>
<tr>
<td>14</td>
<td>5,37E+00</td>
<td>4,50E+01</td>
<td>3,00E+00</td>
</tr>
<tr>
<td>15</td>
<td>7,16E+00</td>
<td>2,20E+01</td>
<td>4,00E+00</td>
</tr>
<tr>
<td>16</td>
<td>8,95E+00</td>
<td>1,40E+01</td>
<td>5,00E+00</td>
</tr>
<tr>
<td>17</td>
<td>1,07E+01</td>
<td>1,60E+01</td>
<td>6,00E+00</td>
</tr>
<tr>
<td>18</td>
<td>1,25E+01</td>
<td>6,00E+00</td>
<td>7,00E+00</td>
</tr>
</tbody>
</table>

Scope export

Because the scope files can contains multiples scope sequences, the export function will creates multiple files with the following name structure.

*Name of the file give by the user - Internal scope name - incremental value.csv*
7 Connexions manager

Connexions manager interface gives the capability to add instruments in lines.

Connexions manager button

Connexions manager panel

Configuration fields

- **Select instrument controls**: display all the CERSA instruments offer.
- **Port number**: CIM displays the list of all COM ports found by windows operating system.
- **Comm. period**: The communication period between CIM and instrument in seconds. CERSA-MCI recommends to set this period to 1 second to minimize the amount of recorded data and free processor resources.
- **Connexion prefix**: Prefix used to display each measure and event names belonging to the connexion.
- **Connexion type**: Physical type of connexion link. Validated only for RS232.
- **Baudrate**: Baudrate configuration used by the instrument. By default set to 115200.
- **Network address**: Address of connexion in network. By default set to 1.
- **Line number**: If CIM instance manage only one line, the default value is 1. If CIM manages several lines, the line number values must be different for each line. Please read lines manager topic for more information about line names.
- **Rel. position**: Is the distance in meters between instrument and zero reference for length counting system.
- **Master instrument**: Only one instrument in the line can have the master attribute. This attribute is used for display purposes only. For example: reset lines, spool time, spool length and spool number measures are displayed by default only for master instrument. Please refer to the instrument manual for more details about the connexion type, baudrate and...
network address settings.

**Add connexion**

![Add connexion button]

To add a new instrument to the current configuration, you first have to set all previous parameters and click on add button.

**Delete connexion**

![Delete connexion button]

To delete connexion, select the corresponding line in the table and click in delete button.

Any change in the user configuration requires a reset in the line. The following message appears to prevent the user that all the data will be lost:

![Reset line message]

**Start/Stop**

![Start stop button]

This function will starts or stops the communication between CIM and the instrument. In the same time CIM opens or closes the COM port. This function is very useful if another application needs the same COM port to configure instrument.

**Save Preset**

![Save preset button]

Save the user configuration for connexions belonging to the line. The following data are stored for each connexion:

- **Display zone**: the zone where measures and events are displayed.
- **Colors**: colors used to display measures and events.
- **Offset and amplitude**: offset and amplitude values used to display measures in graphs.
- **Position**: position of measures and events in tables and graphs.

**Load Preset**
This function load preset in empty line. To use it you need to select the empty line with "Line number" field.
8 Lines manager

All the general and production configuration of your line is available in this interface.

![Lines manager panel](image)

Remark:

- The parameters in this interface cannot be modified during the production (production status: green).

Here below are listed the detail of options available in line manager interface:

- **Line number**: the line number is the line identifier. It doesn’t represent the line number in your factory but an unique internal identifier, used to make the difference between lines controlled with the same CIM instance.
- **Line name**: use this field to enter the names of your lines in your factory. For example if you have 3 lines: Machine 1, Machine 2 and Machine 3.
- **Default X mode**: the default X mode used to display measures and events in production graphs.
- **Default X reference**: the default X reference used to display measures and events in production graphs.
- **Default current time [minutes]**: the default time used to display measures and events in production graphs when the current mode is selected.
- **Default current length [meters]**: the default length used to display measures and events in production graphs.
production graphs when the current mode is selected. When the user makes changes of X axis settings in production interface, the user can restore the default configuration listed above. Read more details about mode and reference settings management in production x axis chapter.

- **Production configuration**: specifies the way in which product orders are launched. Read product configuration chapter for more details.
- **Database report**: indicates if database report is required. Read data logging chapter for more details.
- **Data file record**: indicates if file data logging is required. Read data logging chapter for more details.
- **Start and stop production**: these fields configure trigger used by CIM to detect production start and stop. Read start and stop production chapter for more details.
- **PLC**: this interface displays communication settings for programmable logical controller. Read PLC topic for more details.
- **Product features**: this interface defines features used for product specifications. Read product features topic for more details.
- **Product specification**: the user can defines with this interface specification for products. Read product specification topic for more details.
- **Feature link**: makes relationships between features and instruments belonging to the line. Read feature link topic for more details.
- **Product order**: this interface gives the possibility to launch production in any CIM registered system. Read product order topic for more details.
8.1 Production configuration

The production can be managed in two modes:

- Programmed mode, the product order is read from CIM_PRODUCT database.
  - You can write the order with CIM product order interface
  - Or you can develop an external system to program the orders in your factory.
- In manual mode the product order is requested by the software at the end of previous production. The operator have to indicate the product type and the batch name manually.

Remark:

- When the production configuration is enabled, product features, product specification and feature link interfaces are not available. You need to disable the production configuration in order to specify your products.
8.2 Data logging

**Database report**

All the results of your production can be stored in distant or local database. To get database report you have to:

- Enable product configuration.
- Define specifications of your products in product specification interface.
- You need also to set links (see feature links for more details).

![Database report disabled / enabled icons.](image)

**Remark:**

- In order to enable production configuration and the database report, you need to choose sources database. You can use database models located at `c:\Program Files\Cersa\CIM\Database` folder.

**Data file record**

Enable this option to record automatically your batch data in a CIM production file. The created file name has the following format:

`RecordPath/Time LineName BatchName.ext`

- **Time:** in `YEAR-MONTH-DAY HOUR:MINUTE:SECONDS` format.
- **LineName:** the name of the line.
- **BatchName:** specified by operator in manual product configuration or by external system in automatic external configuration.
- **ext:** extension for production files. `cimzip` for compressed files and `cimprd` for uncompressed files. See more details about extensions in Load file topic.

For example: `C:\Program Files\Cersa\CIM\Records\2010-05-30 20:53:59 Machine_1 PREF1.cimprd`
8.3 Start and stop production

The production can be started and stopped automatically with different criteria:

**Start with speed**

This option defines if the production will refer to the line speed conditions to start (start speed trigger and start during time).

- **Start speed trigger**: determines the speed in meters per seconds to be exceeded to start the production.
- **Start during time**: determines the time in seconds needed to start production when the start speed trigger condition has been exceeded.

**Stop with speed**

This option defines if the production will refer to the line speed conditions to stop (stop speed trigger and stop during time).

- **Stop speed trigger**: determines the speed in meters per seconds below which the production is stopped.
- **Stop during time**: determines the time in seconds needed to stop production when the stop trigger condition has been reached.

**Remark:**

- The start speed trigger must have a superior value than the stop trigger.

**Start on reset spool**

This option defines if the production will refer to the reset signal to start.

**Start on date** (Not available yet.)

**Stop on date** (Not available yet.)
Stop with date disabled / enabled icons.
8.4 Product features

![Product features panel]

To better understand the product configuration we need to define the following concepts:

**Feature classes**
Defines the physical magnitude to control with instruments (for example the diameter). This concept takes into account the measure, the events and the tolerances. Thus feature classes table lists all the magnitudes to control.

**Feature types**
Defines the types of tolerances to configure for each magnitude (for example: nominal diameter, high diameter and low diameter). The feature types table lists all the tolerances than can be configured.

All these features are stored in CIM_PRODUCT database (global to the factory or specific for several lines) and are needed to build report in CIM_REPORT database. These features are the bases to build product specifications and are completely customizable in order to cover the need of your factory.

A default list is already present in CIM interface and, normally, covers customer needs. If additional features are needed you can use Add, Delete and Update buttons to build new configuration.
8.5 Product specification

This interface defines the tolerances for your products.

- **Product type**: select current product to modify.
- **Add product type**: will create new product and corresponding default features in CIM_PRODUCT database.
- **Delete product type**: will delete the selected product type.
- **Update product type**: give you the possibility to change the name of your product.

The product specification table display all the tolerances for the selected product.

- **Add new feature from your feature list**: select in feature types ring control the feature and click on add feature button to enter the correspondent value.
- **Delete feature type**: will delete feature from current product.
- **Update feature type**: gives the capability to modify the current value of the feature.
8.6 Feature link

To finish the configuration of products in your factory you need to make links between the features and the instrument that will control these features. You have to repeat this procedure for each production line.

Feature tables display all the features, in the first column, and the corresponding link with the instrument, in the second column. You need to link feature types with tolerances and feature classes with events.

For example:
- Cladding diameter is controlled with LIS-G for the current line.
  - You need to select LIS-G instrument in select instrument control.
  - Select Nominal diameter tolerance in Tolerances table.
  - Select Cladding diameter nominal in Feature types table.
  - Push link button.
  - The link appears in second column of feature types table.
- Make the same actions for all the features. Change the instrument when necessary.
- Make also the links for feature classes.

Remark:
- Your configuration is completed if all features types and features classes are linked.
8.7 Product order

This interface gives the capability to send an order to any line sharing your product configuration. To share the same product configuration you need to declare the same CIM_PRODUCT database path. Read lines manager topic for more information about how to select database path.

You need to:

- Select the line.
- Select the product to produce.
- Click on Add button, Then the batch name will be requested.

A new line appears in order table with red status. When the status changes to green color the line has taken in account the order. When the production is finished the status of the order becomes red.

You can delete orders only when the status of the order is red by clicking on delete button.
9 Preferences

Preferences button

Preferences interface contains options related to the software.

- **Change password**: See change password topic for more details.
- **File compression**: This option will compress CIM files automatically when the user makes save selection, save scopes, save sequence or in automatic cim data file record. Compressed files have .cimzip extension.
- **Cim id**: Unique identifier for CIM instance in your factory. This parameter is absolutely necessary in case of external database architecture. Please refer to line manager topic for more details about line production configuration.
9.1 Change password

This interface allows you to change password for customer levels. To make this please follow this procedure:

- Select the level to change.
- Enter the new password.
- Confirm the new password.
- Apply changes.

To modify supervisor and user password you need to know supervisor password in order to display preferences and change password interfaces.
10 Touchpad panel

Touchpad interface

Touchpad interface appears when the user needs to enter text or numeric value by touching the control. Restore button gives the capability to restore the source value.

Here below is presented the available configuration of touchpad:

- **Numeric pad**
- **Uppercase pad**
- **Lowercase pad**
- **Symbols pad**
Part III: Client databases

Two client’s databases CIM_REPORT and CIM_PRODUCT will be hosted in local or distant machine (ethernet access). See required PC specifications for more details about network configuration.
The database type is SQLite3. (Used by Symbian, Mozilla, Adobe, Bloomberg…).

SQLite3 general information:

- The ODBC driver for windows NT/2000/XP will be provided by CERSA. It is conform to SQL-92 standard (ISO 9075).
- For more information about SQLite3 please visit:
  http://www.sqlite.org
  http://www.ch-werner.de/sqliteodbc/
1 Database relationships
2 CIM product database

This database contains the features (measurements parameters) for different products, and the production orders. See lines manager topic for more details about features.

CIM_PRODUCT database contains 8 tables described here below.
2.1 TB_CIM_LINE_STATEMENT

This table contains statements for every line using CIM_PRODUCT database in factory.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Datatype</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_StatementId</td>
<td>Identifier for statement.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td>(Primary key)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT_CimId</td>
<td>Identifier for CIM target application that</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT_LineNumber</td>
<td>Line identifier given by CIM when line is</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHR_LineName</td>
<td>Client line name.</td>
<td>CHAR(96)</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
</tbody>
</table>

Remark:

- Every CIM application must have a unique identifier (INT_CimId) which can be set by user interface (See preferences topic for more details). Line number and line name can be set also by user interface (See lines manager topic for more details).
- This table is completely managed by CIM.
## 2.2 TB_FEATURE_CLASS

This table lists all features classes that can be controlled and managed by CERSA instruments in production process. These features classes are associated with instrument events and measures. See Product features topic for more detail about features.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Datatype</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_FeatureClass</td>
<td>Feature class identifier.</td>
<td>INTEGER</td>
<td>No</td>
<td>Read/W</td>
</tr>
<tr>
<td>(Primary key)</td>
<td></td>
<td></td>
<td>units</td>
<td>write</td>
</tr>
<tr>
<td>CHR_FeatureClassName</td>
<td>Client feature class name.</td>
<td>CHAR(96)</td>
<td>No</td>
<td>Read/W</td>
</tr>
<tr>
<td>Name</td>
<td></td>
<td></td>
<td>units</td>
<td>write</td>
</tr>
</tbody>
</table>
2.3 TB_FEATURE_CLASS_EVENT_LINK

This table contains links between feature classes, instrument events and measures.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Datatype</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_CodeConnexionsNumber</td>
<td>Identifier code of instrument event and measure in CIM interface</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_FeatureClass</td>
<td>Feature class identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_LineNumber</td>
<td>Line identifier given by CIM when line is created.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>CHR_LineName</td>
<td>Client line name.</td>
<td>CHAR(96)</td>
<td>No units</td>
<td>Read</td>
</tr>
</tbody>
</table>

Remark:

- This table is completely managed by CIM user interface and is accessible only for reading.
### 2.4 TB_FEATURE_TYPE

This table lists all features types necessaries to whole characterize products in your factory. These features types will configure instrument tolerances. See Product features topic for more detail about features.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_FeatureType</td>
<td>Feature type identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/W write</td>
</tr>
<tr>
<td>(Primary key)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHR_FeatureTypeName</td>
<td>Client feature type name.</td>
<td>CHAR(96)</td>
<td>No units</td>
<td>Read/W write</td>
</tr>
<tr>
<td>Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.5 **TB_FEATURE_TYPE_TOLERANCE_LINK**

This table contains links between feature types and instrument tolerances.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Datatype</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_CodeConnexionsNumber</td>
<td>Identifier code of instrument tolerance parameter.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_FeatureType</td>
<td>Feature class identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_LineNumber</td>
<td>Line identifier given by CIM when line is created.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>CHR_LineName</td>
<td>Client line name.</td>
<td>CHAR(96)</td>
<td>No units</td>
<td>Read</td>
</tr>
</tbody>
</table>

**Remark:**
- This table is managed by CIM user interface and is read-only accessible.
### 2.6 TB_PRODUCT_TYPE

In this table, the customer lists the product types used in the factory.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_ProductType</td>
<td>Product identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td>(Primary key)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHR_ProductName</td>
<td>Client product name.</td>
<td>CHAR(96)</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2.7 TB_PRODUCT_SPECIFICATION

This table specifies all features for each product used in your factory.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_SpecificationId (Primary key)</td>
<td>Product specification identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td>INT_ProductType</td>
<td>Product type for specification.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td>INT_FeatureType</td>
<td>Feature type for specification.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read/Write</td>
</tr>
<tr>
<td>DBL_Value</td>
<td>Feature value characterizing the product.</td>
<td>DOUBLE</td>
<td>Unit of feature type</td>
<td>Read/Write</td>
</tr>
</tbody>
</table>

**Remark:**

- Features specification for high and low tolerances are relative to nominal values.
### 2.8 TB_PRODUCT_ORDER

This table will register all production orders made by the external database system. When the client wants to produce specific product, client database application or CIM user interface must write in this table the product to draw and set INT_StartOrder flag to 0. As soon as CIM will read it, it will switch to 1. When production of the current order is finished, CIM store the last spool number and change flag "INT_StartOrder" to 2.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_OrderId (Primary key)</td>
<td>Product order identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>CHR_DateTimeOrder</td>
<td>Date and time at which the order has been requested.</td>
<td>CHAR(260)</td>
<td>YYYY-MM-DD HH:MM:SS.SSS</td>
<td>Write</td>
</tr>
<tr>
<td>INT_CimId</td>
<td>Identifier for CIM target application that controls the line in which you want to produce.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Write</td>
</tr>
<tr>
<td>INT_LineNumber</td>
<td>Line number in which you want to produce.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Write</td>
</tr>
<tr>
<td>CHR_BatchName</td>
<td>Name of batch to produce.</td>
<td>CHAR(96)</td>
<td>No units</td>
<td>Write</td>
</tr>
<tr>
<td>INT_ProductType</td>
<td>Type of product to produce.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Write</td>
</tr>
<tr>
<td>INT_StartOrder</td>
<td>This flag permits CIM to know which order has been taken in account.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Write</td>
</tr>
<tr>
<td>INT_LastSpool</td>
<td>The number of last spool produced for current order.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
</tbody>
</table>
3 CIM report database

When starting the production or when changing a preform (batch), a new CIM data file is created automatically. This data file contains all measurements and events from the instruments.

Because the CIM data file is not readable by other software, we store the summarised data for each spool in this client's database.

CIM_REPORT database contains 4 tables.

Remark:

- The maintenance of these 4 tables has to be done by the client. In order to limit the size of those tables, we recommend you to erase the records periodically.
3.1 **TB_SPOOL**

This table contains necessary information to identify spools in production management.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_SpoolId (Primary key)</td>
<td>CIM_REPORT database spool identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_SpoolNumber</td>
<td>Spool number for specific batch.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_SpoolLength</td>
<td>Spool length.</td>
<td>DOUBLE</td>
<td>meters</td>
<td>Read</td>
</tr>
<tr>
<td>CHR_SpoolDateTimeStart</td>
<td>Start date and time of the spool.</td>
<td>CHAR(32)</td>
<td>YYYY-MM-DD HH:MM:SS.SSS</td>
<td>Read</td>
</tr>
<tr>
<td>CHR_SpoolDateTimeEnd</td>
<td>End date and time of the spool.</td>
<td>CHAR(32)</td>
<td>YYYY-MM-DD HH:MM:SS.SSS</td>
<td>Read</td>
</tr>
<tr>
<td>INT_CimId</td>
<td>Identifier for CIM target application that controls the line in which you want to produce.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_LineNumber</td>
<td>Line number in which you want to produce.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_ProductType</td>
<td>Product type for spool. Product types are defined in CIM_PRODUCT database in TB_CLIENT_PRODUCT_TYPE table.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>CHR_BatchName</td>
<td>In optical fibre configuration this field corresponds to preform name.</td>
<td>CHAR(96)</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>CHR_CimDataFileRecordPath</td>
<td>CIM data file record path.</td>
<td>CHAR(260)</td>
<td>No units</td>
<td>Read</td>
</tr>
</tbody>
</table>
3.2 TB_SPOOL_FEATURE_CLASS_EVENTS

Contains summary information about events detected for each spool. Instrument events are associated with feature classes (defined in CIM_PRODUCT database in TB_FEATURE_CLASS table).

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>R/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_SpoolEventId</td>
<td>Event type identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_SpoolId</td>
<td>CIM_REPORT database spool identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_FeatureClass</td>
<td>Feature class. It represents event types (diameter tolerances, defects, ...)</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_HighLowToleranceSign</td>
<td>If positive specifies high out of tolerance. If negative specifies low out of tolerance.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_NumberOfEvents</td>
<td>Number of occurrences for event in spool.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
</tbody>
</table>
### 3.3 TB_SPOOL_FEATURE_CLASS_EVENTSDetalle

Contains the detail of events detected for each spool.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>Read / Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_SpoolEventDetailId (Primary key)</td>
<td>Event type identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_SpoolId</td>
<td>CIM_REPORT database spool identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_FeatureClass</td>
<td>Feature class. It represents event types (diameter tolerances, defects, ...)</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_HighLowToleranceSign</td>
<td>If positive specifies high out of tolerance. If negative specifies low out of tolerance.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_ExtremumValue</td>
<td>Maximal value of event if INT_HighLowToleranceSign = 1. Minimal value of event if INT_HighLowToleranceSign = -1.</td>
<td>INTEGER</td>
<td>Unit of event type</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_SpoolTime</td>
<td>Time at which the event was started from begins of spool.</td>
<td>DOUBLE</td>
<td>seconds</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_Duration</td>
<td>Event duration</td>
<td>DOUBLE</td>
<td>seconds</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_SpoolPosition</td>
<td>Position at which the event was started from begins of spool.</td>
<td>DOUBLE</td>
<td>meters</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_Length</td>
<td>Event length</td>
<td>DOUBLE</td>
<td>meters</td>
<td>Read</td>
</tr>
</tbody>
</table>
### 3.4 TB_SPOOL_FEATURE_CLASS_STATISTICS

This table gives necessary statistic information to qualify and certify the spool production.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Data type</th>
<th>Units</th>
<th>Read / Write</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT_SpoolStatisticId (Primary key)</td>
<td>Statistic identifier for this table.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_SpoolId</td>
<td>CIM_REPORT database spool identifier.</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>INT_FeatureClass</td>
<td>Feature class. It represents measure types (diameter, tension ...)</td>
<td>INTEGER</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_ErrorPercentage</td>
<td>Percentage of invalid measures (due to defects, fibre out of position...)*</td>
<td>DOUBLE</td>
<td>%</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_ProcessCapabilityCp</td>
<td>Process capability Cp index. **</td>
<td>DOUBLE</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_ProcessCapabilityCpk</td>
<td>Process capability Cpk index. **</td>
<td>DOUBLE</td>
<td>No units</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_Average</td>
<td>Measure of “middle” or “expected value” of process. Obtained by arithmetic mean, geometric mean...***</td>
<td>DOUBLE</td>
<td>Unit of measure type.</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_StandardDeviation</td>
<td>Measure of process spread. Obtained by computing square root of variance. ***</td>
<td>DOUBLE</td>
<td>Unit of measure type.</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_MinimalValue</td>
<td>Minimal value of measure in process.</td>
<td>DOUBLE</td>
<td>Unit of measure type.</td>
<td>Read</td>
</tr>
<tr>
<td>DBL_MaximalValue</td>
<td>Maximal value of measure in process.</td>
<td>DOUBLE</td>
<td>Unit of measure type.</td>
<td>Read</td>
</tr>
</tbody>
</table>

**Remarks:**

* Statistics includes only valid measures.

** Process capability:

\[
C_p = \frac{USL - LSL}{6 \times \sigma} \\
C_{pk} = C_p - \frac{|m - \mu|}{3 \times \sigma}
\]

USL = Upper set limit.  
LSL = Lower set limit.  
\(\sigma\) = Standard deviation.  
m = Nominal value of specifications.  
\(\mu\) = Process average.

*** Average:
\[ \mu = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i \]

\( x_i \) = Data set.
\( n \) = number of measures.

**** Standard deviation:
\[ \sigma = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (x_i - \mu)^2} \]