

iDeaX Africa

SmartFactory Report Tool

User Guide

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Objective of this guide

This document is intended for anyone wishing to use the iDeaX Africa SmartFactory Report Tool. The purpose of this document is to teach you how to use this software in a fairly easy and quick guide. At the writing of this document, just keep in mind that some information given in this document might have changed especially on the graphical interface of the application but the functionalities are still the same as we are still in constant improvement of the SmartFactory Report Tool.

This document contains a detailed view of this software with illustrations and figures in support to help you exploit all the options and opportunities that are offered in this application.

I Start of Application

After successful installation on the computer, launching the application via the shortcut either from the desktop or all programs in the start menu of the Operating System [OS], the application start runs as shown in Figure 1 below. It is performing a loading process in the background and checking that the same application does not execute twice. The application launch can be stopped by clicking on the exit button on the top right of this interface if required.



Figure 1: Start of application

II Login & Server Connection

Being a client-server application, using the SmartFactory Report application requires authentication, then a connection to the server, that is to say, currently it must be in the same local area network (LAN) as the server to run. To use this application, the server requires a login and a password.

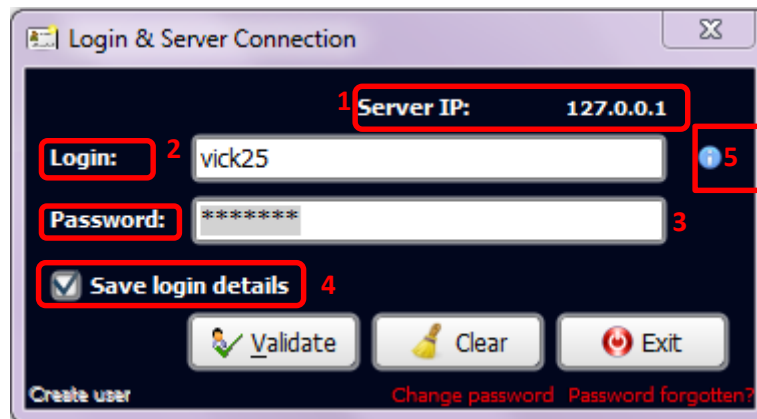


Figure 2: Login and Server Connection

This interface provides the following:

The Server IP Address [1]

The Server IP loads with a default IP (127.0.0.1) meaning that the server and database are located on the same machine as the current application. Otherwise your database administrator must provide the Server IP where the actual server and database that host the SmartFactory data is located. Clicking on the IP address hyperlink brings forth this interface as shown below:

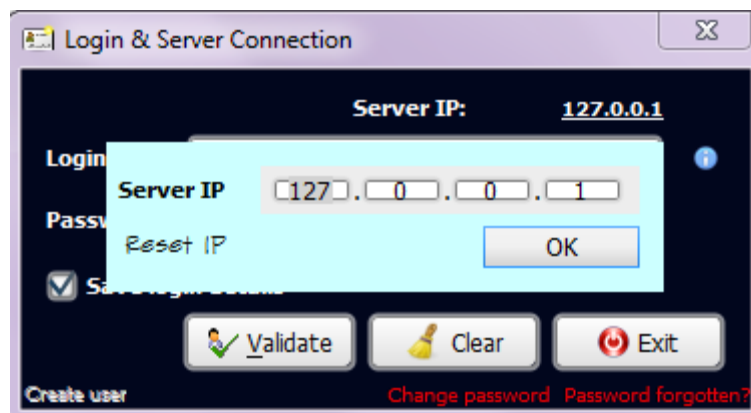


Figure 3: Server IP

In the 4 labels boxes provided, type in the Server's IP and then click the "OK" button. "Reset IP" as the name implies, resets to the default IP (127.0.0.1).

The Login [2]: The default Login of the SmartFactory Report Tool is "root", with The password: "root123". NB: Password length must be 6 or more characters long. The "root" login only helps to activate the "Create User" hyperlink to create a user who will eventually have to log in next time with his new credentials to use the reporting tool. Clicking on the "Validate" button or on the "Create User" hyperlink while is activated plays the same role.

For a user login different from the "root", the user is given the opportunity to save his login details in order to save time on subsequent logins. Saving is currently only for the machine user or the last person that logged in and saved his details to use the application.

[5] displays a quick help tip for the login as shown in the interface in Figure 4.

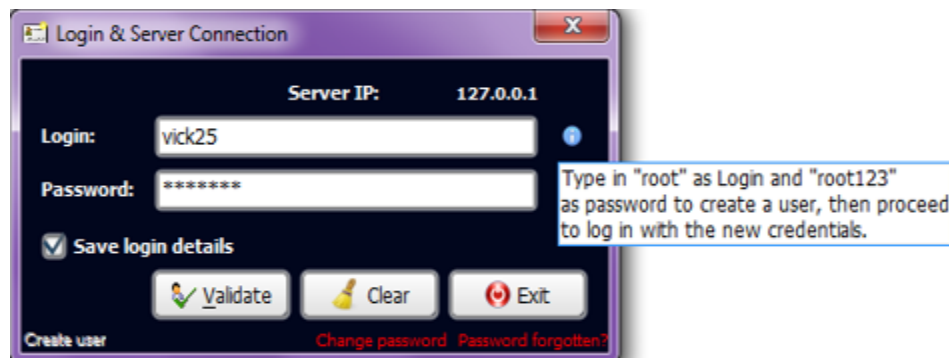


Figure 4: Login and Password help tip

The "Clear" button clears and resets the interface. "Exit" button closes the application. If no errors, clicking on the "Validate" button loads the Main interface. This process might take a bit longer as it checks in to see if a connection to the database is available and also the user has entered the correct login details as registered.

Change Password: in case the user needs to change his/her password.

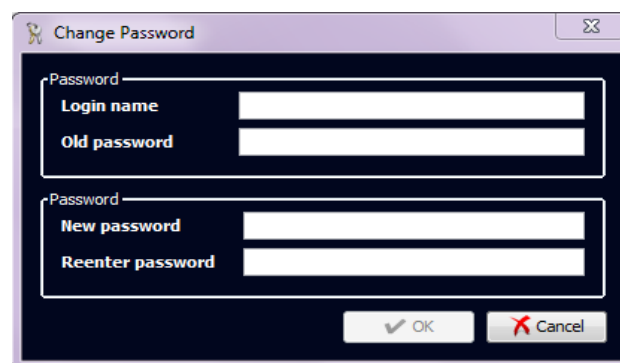


Figure 5: Change password

Password forgotten: In case the user does not recall his/her password; type in your login and the question the user selected in the "Create User" interface will be shown. The user needs to enter the correct answer as shown in Figure 6 and Figure 7.

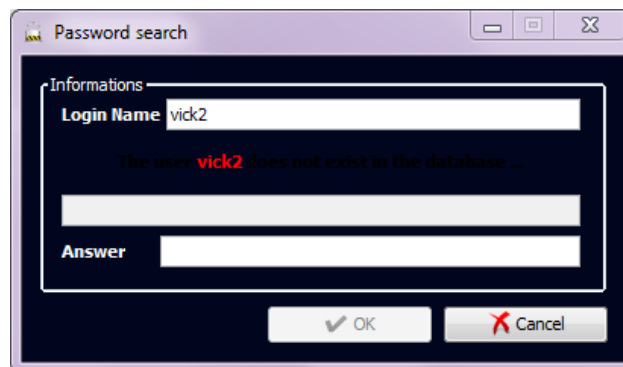


Figure 6: Password Search

User's Question

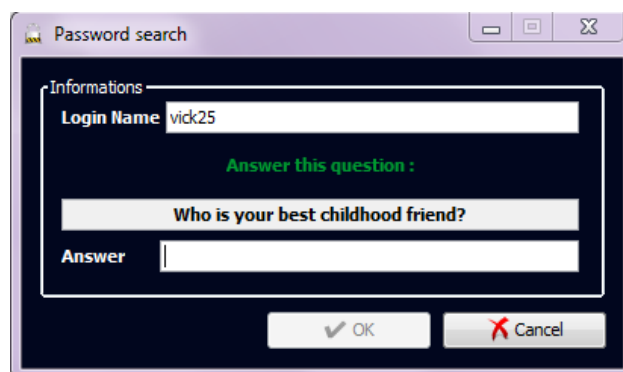


Figure 7: Password search, user's question

"Create/Add User" Interface: this interface creates a user who will use the current application. Some fields are required and are shown with a red asterix (*) in front of the components label name. Remember, the password fields are 6 or more characters long.

New User

Identity

First name*

Surname*

Other name

E-Mail*

Parameter

Login Name*

Password*

Repeat Password*

Others

User type ☒ Simple User ☐ Administrator

Secret question*

Personal question*

Answer*

*Required field

Figure 8: Create User interface

This brings us to the next and more dense part of the application after the user has successfully inserted his/her login credentials and validated.

III Main Interface

The main interface (Figure 9) has a menu bar, tool bar and status bar as normal Windows applications. Provided is a Main Menu on the left-hand side of the interface, customizable by the user to be placed or moved anywhere. The blank-empty space is reserved for viewing any further interface on user click of an option listed in the Main Menu.

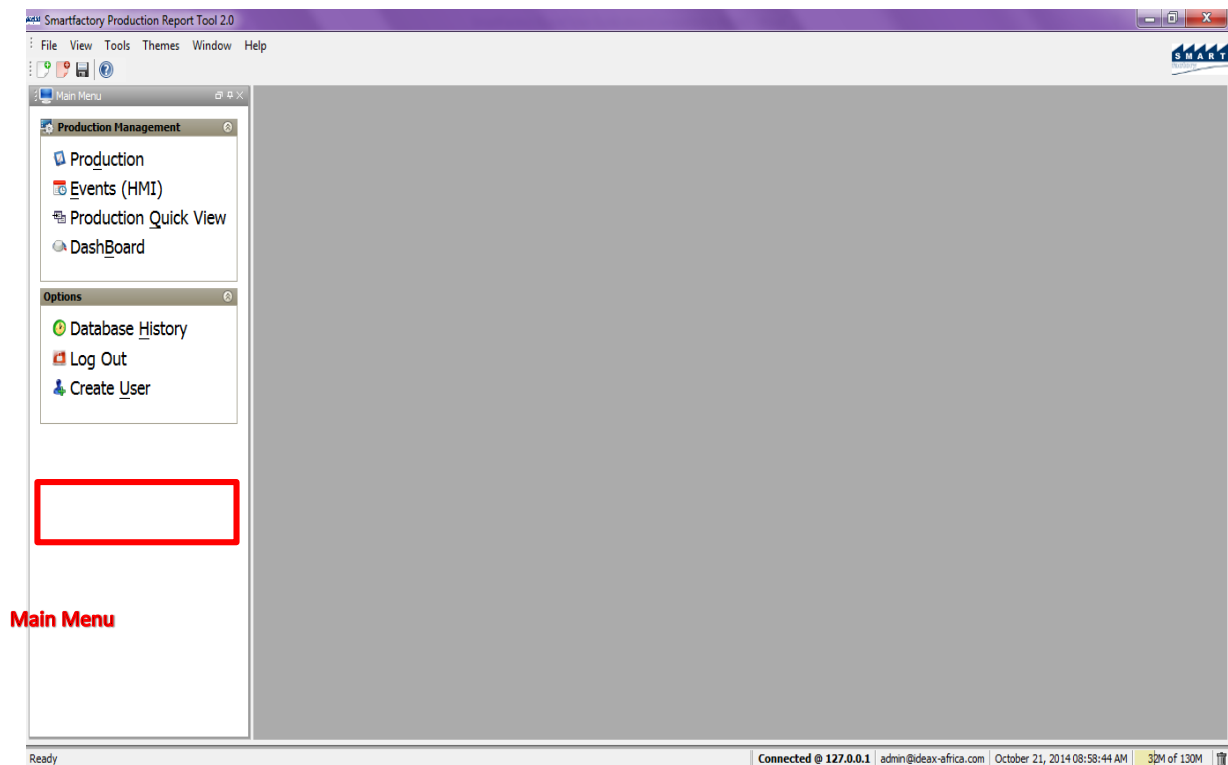
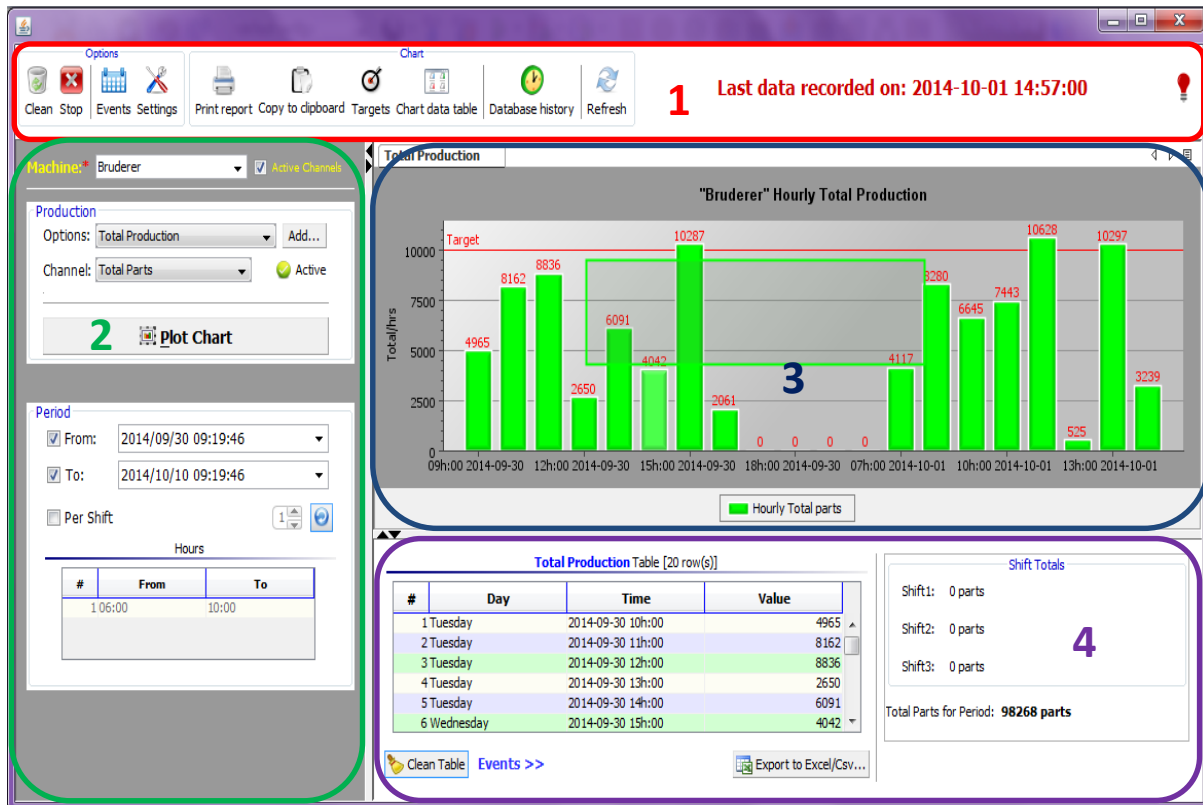


Figure 9: Main Application Interface

Status Bar. The status bar shows the IP Address of the server (i.e. 127.67.0.2) to which the application is connected. The contact email address, current time and the dynamic live memory the OS has allocated to the application with its garbage collector to free some memory (although the user can also free some memory, the application does the same after some time based on the OS configuration).

The Main Menu is subdivided into 2 sections mainly the Production Management and Options. The former is basically the root where the user will spend most of his time. Every effort has been made to break the Production Management into modules and also to ease the user in seeking the correct information he/she may want for his production factory. Thus, the modules are: Production, Events (HMI), Production Quick View and Dashboard. The modules are viewed by either clicking on them or by using the mnemonic quick access (e.g. Alt+d opens the Production Toolkit). For better viewing of each of the modules, they are not shown in the blank-empty space of the Main Interface but as separate interfaces that stand on their own.

A- Production Toolkit



Divided in 4 sections.

1- Production Toolbar



Figure 11: Production toolbar

Some toolbar buttons are only activated by the presence of a chart in (3).

- Clean: reset the interface to its original state.
- Stop: stop a current process when it shows the cursor in activity.
- Events: a quick way to open the Events (HMI) modules for the selected machine.
- Settings: options for the production module.
- Print report: shows a basic style sheet report of the plotted chart in (3).
- Copy to clipboard: copy the available chart in (3) to be pasted in any document of choice as an image.
- Targets: open the "Target" interface where the user has the ability to add/change a machine production target
- Chart Data table: in case the table

does not have any data while the chart has loaded in (3), clicking on this button will show the chart data values in a table format in (4)

- Database History: upon clicking, for the particular machine selected, it shows the raw data recorded in the database from the SmartFactory hardware. Mainly used for fault checking.
- Refresh: use to refresh the chart (3) and table (4) if any failure occurred upon the user selections in (2).

2- Machine, Production Options and Period Selections

The module loads with the available factory machines names as shown below which are retrieved from the database as registered with the SmartFactory hardware. A machine selection affects the view of the production module interface.

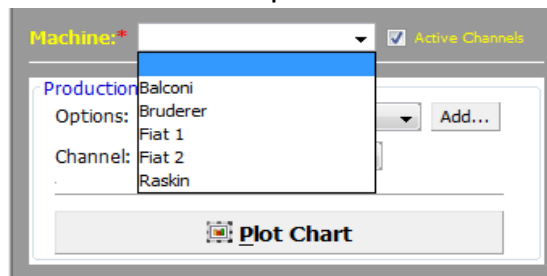


Figure 12: Production Machine selection

Currently, the SmartFactory hardware is configured with 3 options/modes for the production: Cumulative, Rate and Average. Under each option lies a unique channel for the production data. Since the data stream/channel names can vary from different factories and to ease the user selection of what he needs to plot, it was decided that for each of the options, the user must provide a specific name. In case, the "Options" list is empty or a new option needs to be added or modified, clicking on the button "Add..." as shown in Figure 13 will bring up the options.

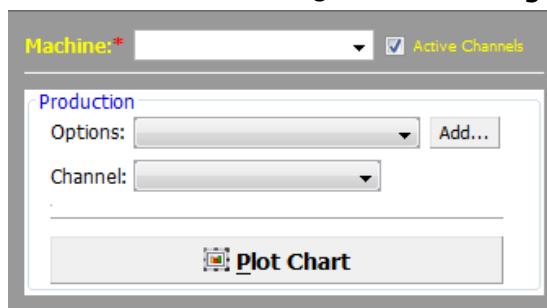


Figure 13: Production Data Options

Production Options

The "Mode" list retrieves the available data channels configured as specific modes in the SmartFactory hardware from the database. A refresh button is provided in case no channel with the mode configuration is available.

Give a "Name" for a selected mode in the list and click "Add" button to show in the table below. By default, useful names are already provided for the user to ease the process. If the mode already exists in the table a message shows in the name field. The user still has the opportunity to edit the module name he has inserted as the table column Name is editable.

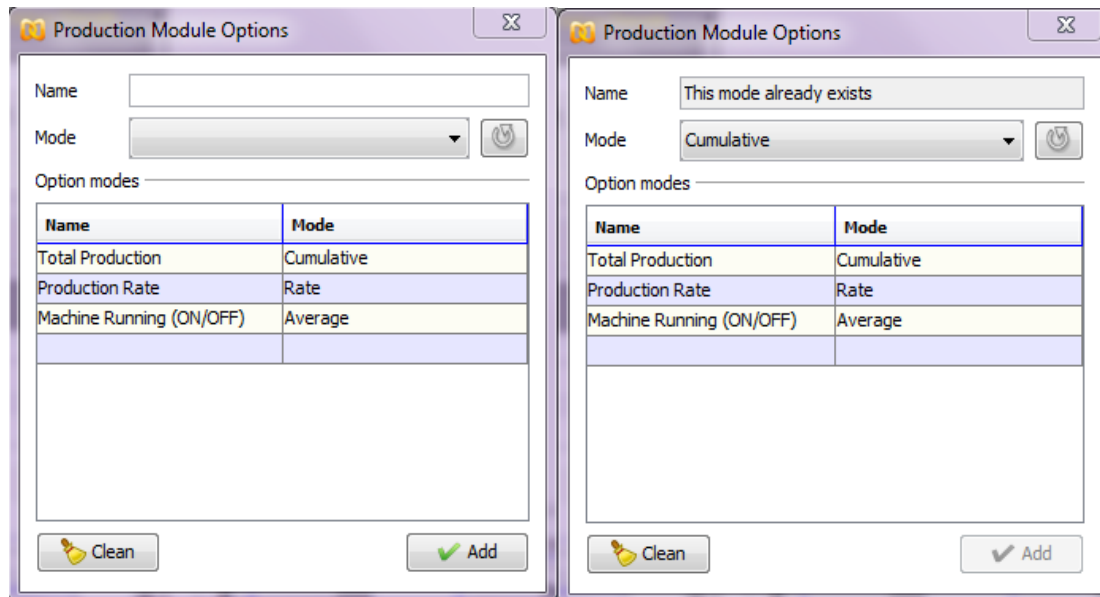


Figure 14: Production mode interface

"Clean" button cleans the table and refreshes the mode list. Exiting the interface will populate the Production Modules list in the previous figure (Figure 13).

Upon selection of a Machine and its production modes, its' corresponding channel is automatically selected for the user as shown in Figure 15 below. The channel is shown as active and the *last date time of the data logged* via this channel is shown in the white empty space on the toolbar (1). Production options selection also shapes the view of the production toolkit for useful information to the user.

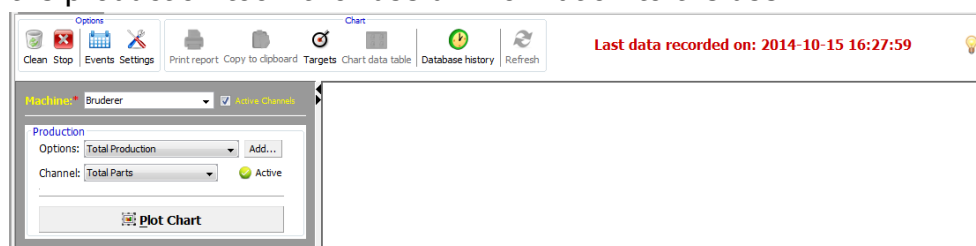


Figure 15: Last data logging time

Clicking on the "Plot Chart" button, plots a chart if and only if the period selection are in the range of data availability in the database. This bring us to discuss the period selection in the next lines.

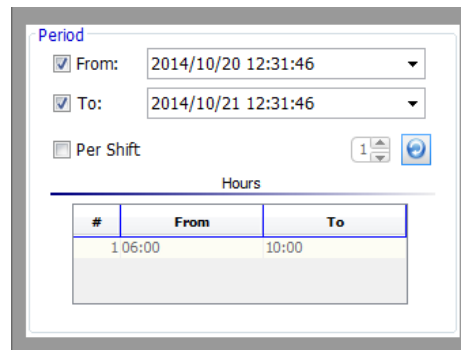
Period selection

Period is divided into 2 options mainly normal/default period ("From" and "To" date/time selections) and shifts period where the user must assign the hours based on the number of shifts in the factory.

- Default Period option (One day difference):

From: previous day but the same time of the "To" date

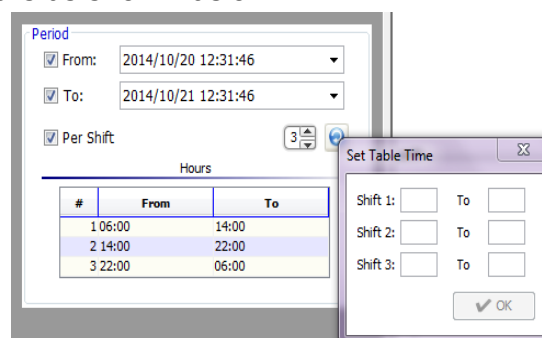
To: current time when the Production module interface loaded



#	From	To
1	06:00	10:00

Figure 16: Production Periods

- Per shift option: if selected, it activates the table and the number field to increase the table row. The refresh button only inserts defaults time values in the table. By double-clicking on the button only if the table row is 3, a small dialog pops up to enter manually the hours as shown below.



#	From	To
1	06:00	14:00
2	14:00	22:00
3	22:00	06:00

Figure 17: Per shift interface option

Thus, after setting the correct periods clicking on the "Plot Chart" will plot a type of chart (bar, line or step chart).

- Provision is made that for the default period, after modifying the "From" date, the plotting of the charts starts automatically thus disabling the "To" date component until the chart shows.

3- Charts

- Chart Zooming feature:

Left-click the mouse button and drag, draws a rectangular greenish shape on the selected chart area and upon release, zooms the chart.

Right-click the mouse button to restore the chart to its original view.

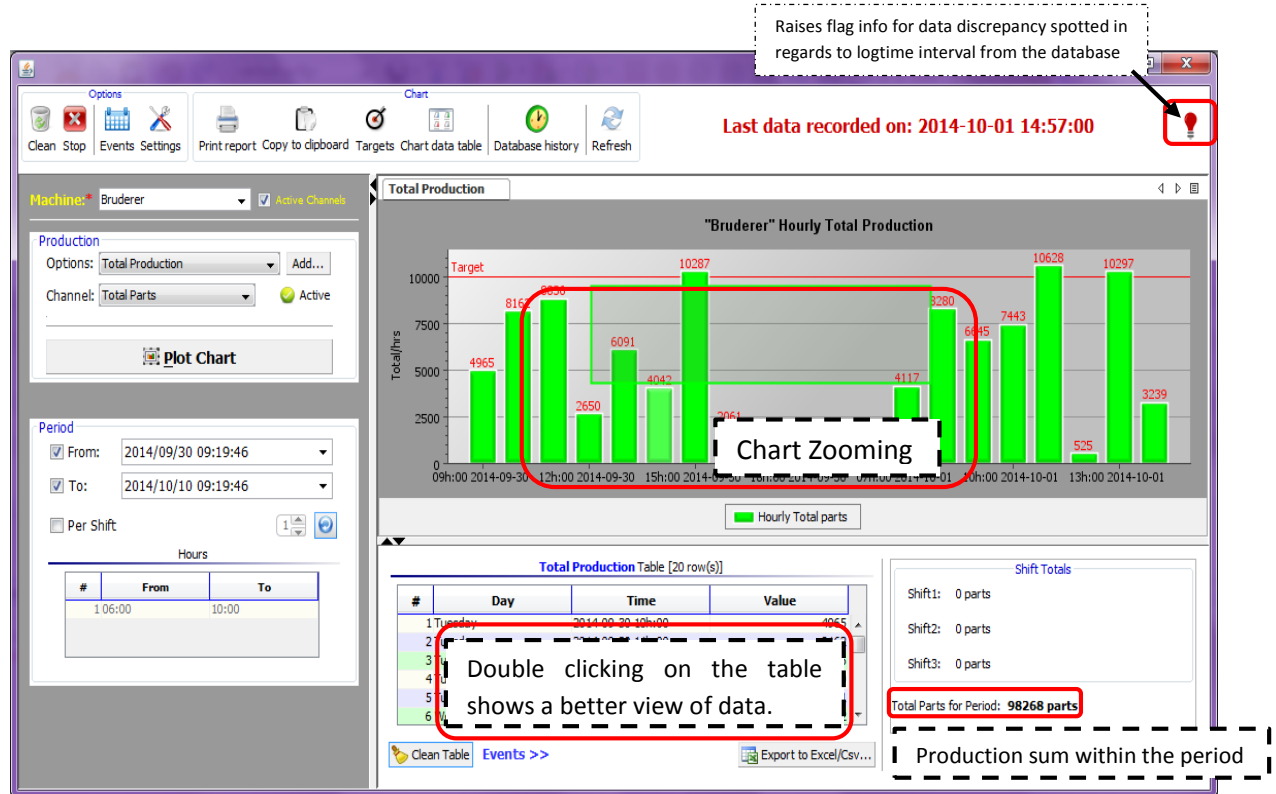


Figure 18: Production plot chart

- Just to emphasize on the Last Data Recorded message showing in the toolbar (1): the message shows the date and time of the last recorded data for the selected machine via its channel. You don't have to necessarily change the "To" unless you need information only up to a date less than the last recorded date and time. This also works best only if the production option selected is not "production rate" since it can take a considerable amount of time for the chart to display if the dates interval is too wide.

4- Information

This part shows the chart data in a table automatically or after clicking on the "Chart data table" button on the interface toolbar (1). On the right side, it shows the Shifts sums if the Per Shift option was selected and the Total parts of production during the period interval the user has chosen. Provided also is the "Export to Excel/Csv" and "Clean Table" buttons.

Export to Excel

The default file saving location is the Computer User local directory and a default file name for the file like "data_141021_153155" is given; the user has the right to change location and the file name. File of type list the choice between an Excel and a Csv file.

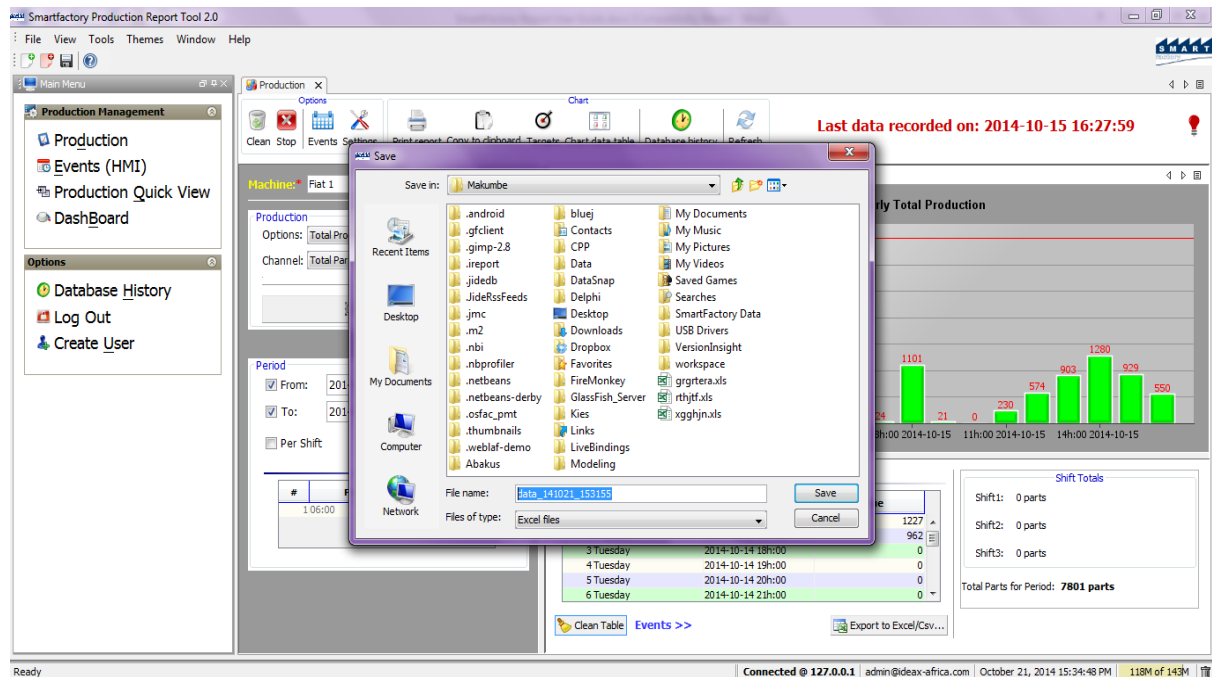


Figure 19: Chart data export to excel

- Print report

Clicking on the "Print report" button of the toolbar shows the "Report Options" interface (Figure 20) with empty fields for the user to enter some information to be displayed on the report. This information is saved to ease the user next printing time. Choice is provided to print the table and chart or only one if the case.

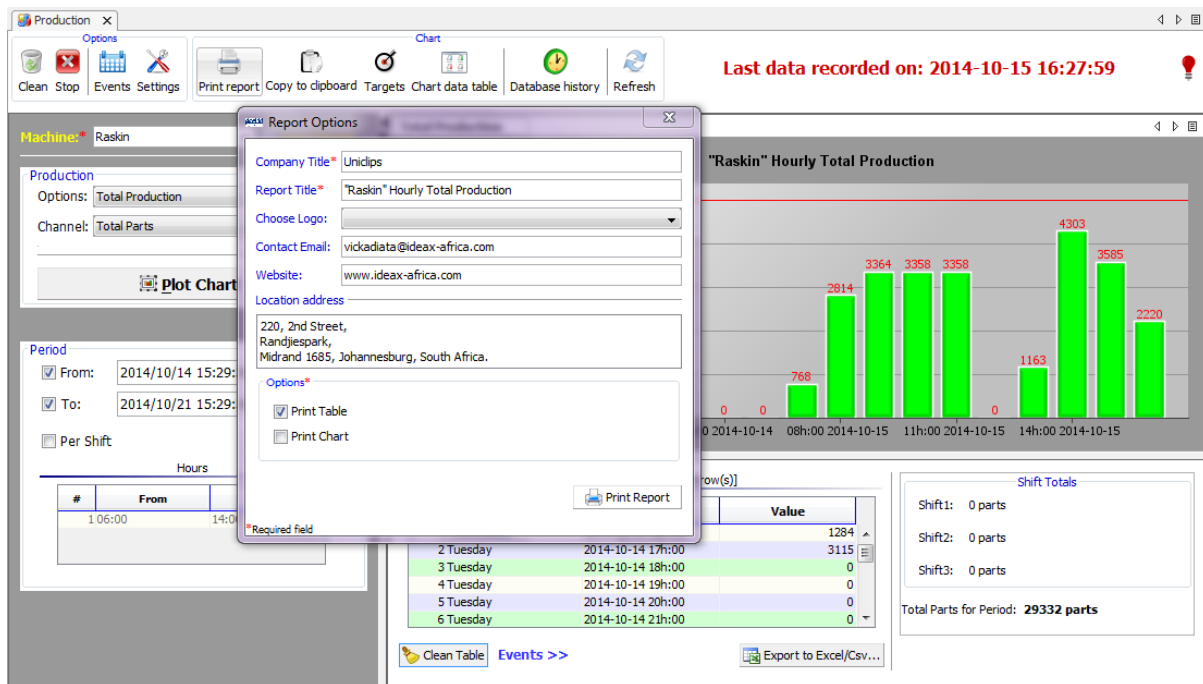


Figure 20: Preview and Printing options

Clicking on the "Print Report" button of the "Report Options" interface (Figure 20) generates a basic preview of the current chart and its table (in case generated) otherwise it only previews the chart or table. With a lot of information retrieved, the table may expand the document to too many pages. Please check the number of pages and be certain that you want to print all of them before confirming the print command on the toolbar of the "Preview and Print" interface.

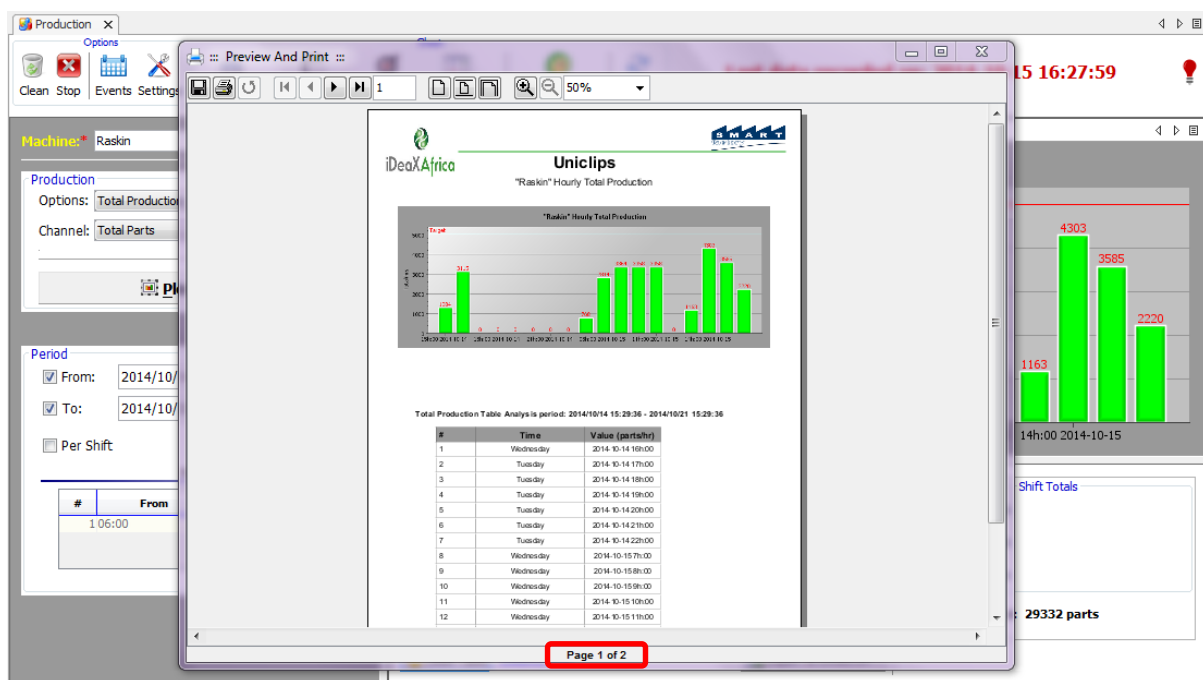


Figure 21: Print Preview document

With the toolbar buttons of the "Preview and Print" interface, provided are the options to the report in (pdf, doc, excel, etc.), Print on the go the document, Zoom....

- Targets

Clicking on the toolbar "Targets" button of the production modules, shows the Machine Target Value interface. Its title changes accordingly to the targets units selection. The target is calculated per hour but provided is the ability for the user to insert the target production value in per second or per minute which will then be converted into hourly targets.

No	Machine(s)	Production Start Time	Production End Time	Target Production Rate	Target Total Production
1	Balconi	07:30	16:35	0	6,000
2	Bruderer	07:30	16:35	0	10,000
3	Fiat 1	07:30	16:35	0	3,500
4	Fiat 2	07:30	16:35	0	3,500
5	Raskin	07:30	16:35	0	5,000

Figure 22: Machine Target Interface

Row selection of a machine displays its target production settings (Start and End time, Breaks) (Figure 23). The user has the ability to add, edit or remove some settings.

Machines Target Value (hour) X

Enter at least one target value per machine and choose a target unit.

Target Units
☐ per second ☐ per minute ☒ per hour

No	Machine(s)	Production Start Time	Production End Time	Target Production Rate	Target Total Production
1	Balconi	07:30	16:35	0	6,000
2	Bruderer	07:30	16:35	0	10,000
3	Fiat 1	07:30	16:35	0	3,500
4	Fiat 2	07:30	16:35	0	3,500
5	Raskin	07:30	16:35	0	5,000

Production Start Time: 07:30 ☐ Machine operates during break periods?

Production End Time: 16:35 Add breaks: 2

Break Options

Fiat 1 Break Times			
#	Start Time	End Time	Break Name
1	09:30	09:45	TEA
2	12:00	12:35	LUNCH

Use this time settings as universal for all machines

Close
Save Settings

Figure 23: Single machine target settings interface

- Database history

Clicking on the "Database history" shows an interface Figure 15 to display the raw data from the database for all machines configured with the SmartFactory hardware. In case a machine was selected, the machine name is selected as the one the user wants to have a look at the data history. A starting point in time to view the data history is also provided for the user just to ease his view of search.

Data History

Machine: Bruderer

☒ Show history from: 2014/10/14 08:58:34

LogTime	Total Parts	Parts/min	Machine Run
Bruderer			
Bruderer channels			
2014-10-14 08:58:58.0	924856	213.167	0
2014-10-14 08:59:58.0	925069	213.333	0
2014-10-14 09:00:58.0	925283	213	0
2014-10-14 09:01:58.0	925497	213.5	0
2014-10-14 09:02:57.0	925710	213	0
2014-10-14 09:03:57.0	925922	213.5	0
2014-10-14 09:04:58.0	926135	213.167	0
2014-10-14 09:05:58.0	926349	213.5	0
2014-10-14 09:06:58.0	926563	213.333	0
2014-10-14 09:07:58.0	926775	213.333	0
2014-10-14 09:08:58.0	926989	213.333	0
2014-10-14 09:09:58.0	927202	213.333	0
2014-10-14 09:10:57.0	927416	213.333	0
2014-10-14 09:11:58.0	927630	213.333	0

Close

Figure 24: Database History

- Settings (Figure 25)

Time difference: time given in minutes to spot any discrepancy between the intervals of each log data in the database. In case it is greater than the value provided, a flag is raised showing a list of time differences spotted and a red light flashes.

Time shifts: ON/OFF provided and the Max Value is the maximum row of shift hours in a particular factory.

Production rate: choose to show production rate in minutes or in hours depending on the user's choice.

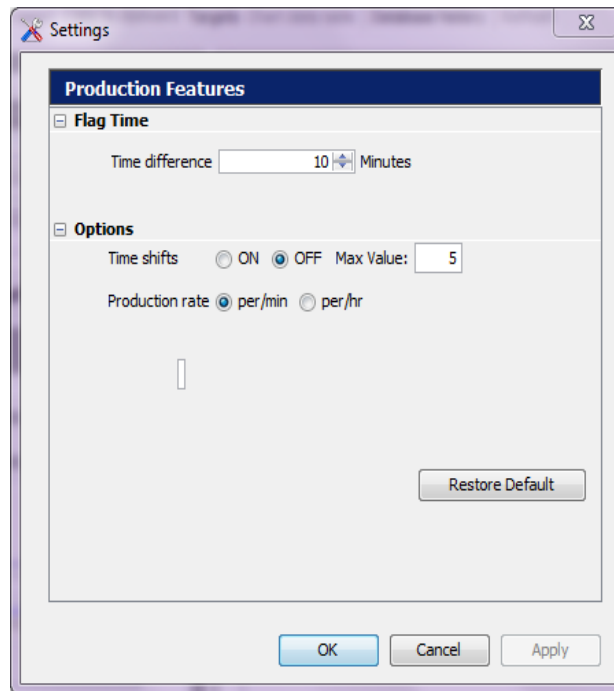


Figure 25: Production toolkit features

B- Events (HMI)

Events occur during production in a factory. Events are divided into two categories: Data and Time

- Data: based on the selection through the options and periods provided, it shows the amount of manufactured parts within the range an operator logged in or logged out for a product in a table.
- Time: basically the same as the events of data but it shows the time spent in hours, minutes or seconds in a pie, line or bar chart based on the user choice.

Events modules is divided into 4 parts:

1- Events Toolbar

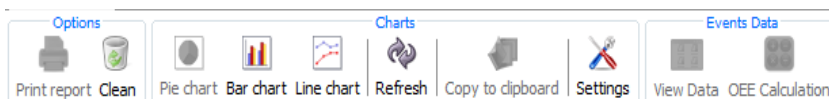


Figure 26: Events modules toolbar

- Print report: refer to the production modules Print report.
- Clean: refresh the interface to its original look.
- Pie, Bar and Line chart: provided to the user to view a chart in his taste.
- Refresh: on some user changes or some inaccuracies of data, refresh might help to generate new information.
- Copy to clipboard: refers to the production modules.

- Settings: settings provided for the events interface.
- View data: used under the Events of Time, to show any available chart data information in a table.
- OEE calculation: advanced production analysis reserved for future development.

2- Events categories, options and production time

- Events information is also currently only for a single machine selection.
- Events are shown on the right-hand side of the interface based on a Machine and correct production period range (dates when data was logged) selections.

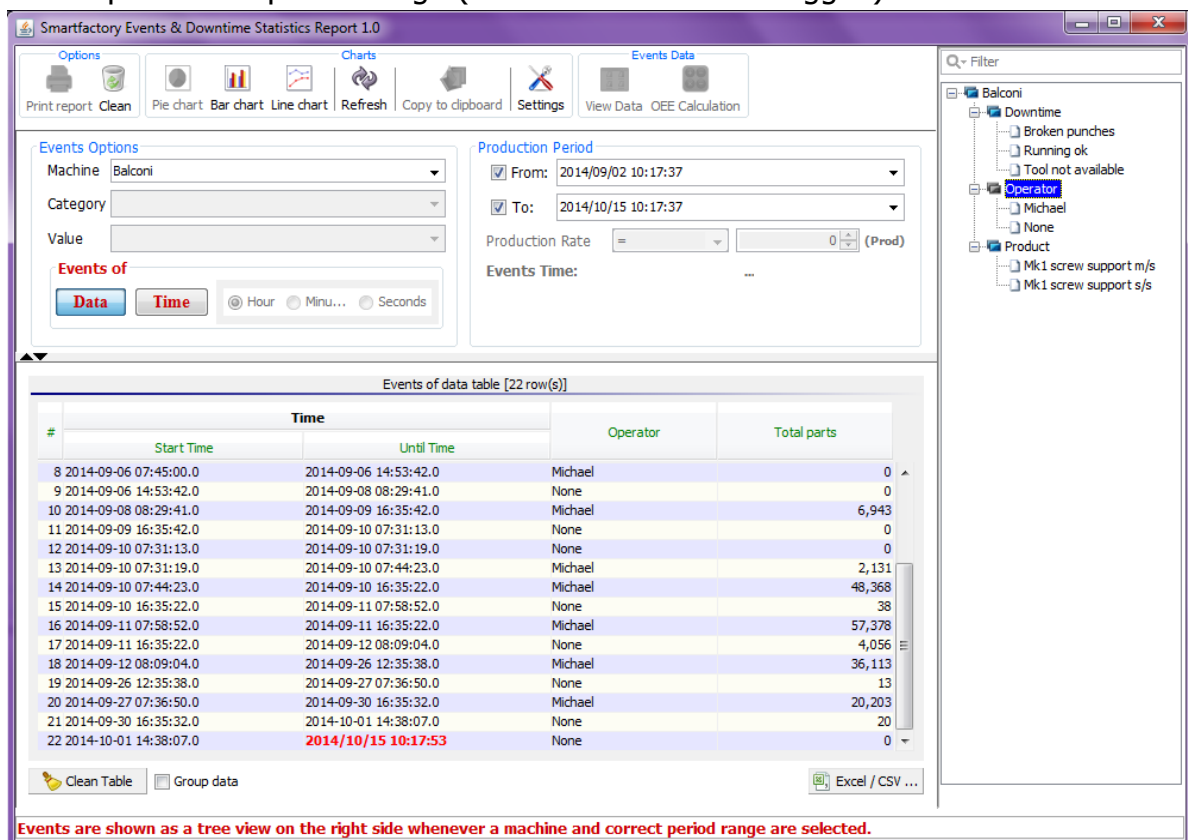


Figure 27: Events view

The above figure shows on the right side events occurred of the "Balconi" machine, "From" period: 2014/09/02 10:17:37, "To" period: 2014/10/15 10:17:37 under the Events of Data. Clicking on the "Operator" of the events tree view, generates the table of all logged operators.

Information highlighted in red in the table shows that the event has not stopped yet or the operator has failed to log an event's termination on the HMI.

The same selection but under Events of Time gives the figure below. It shows the total amount of time (hour, minutes or seconds) spent under each operator, with the total sum of time in the bottom right side of the events tree.

A "(%) Percentage" button is provided to show the sliced time of the pie chart in percentage allocation.

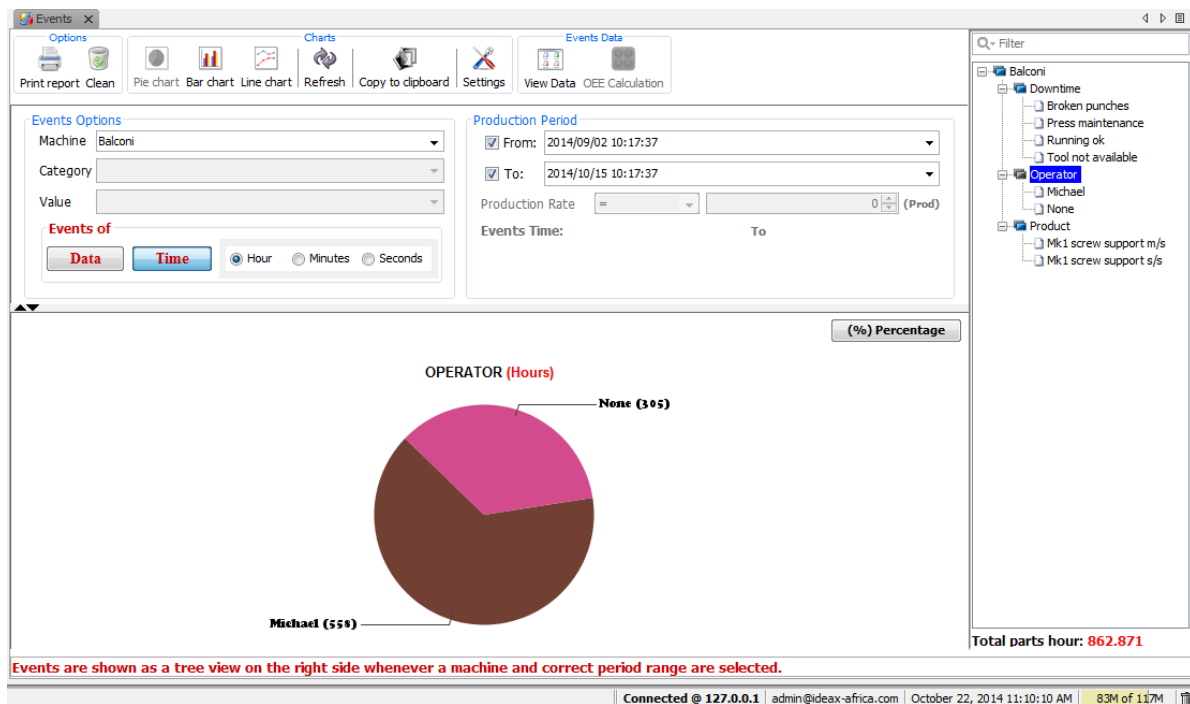


Figure 28: Events Time chart plot

On the Events modules, some of the interface components are disabled for future development.

- View Data: clicking on the "View Data" button after a chart is shown, shows (Figure 29) in a table format the events logged in and the time expressed in Hours, Minutes and Seconds.

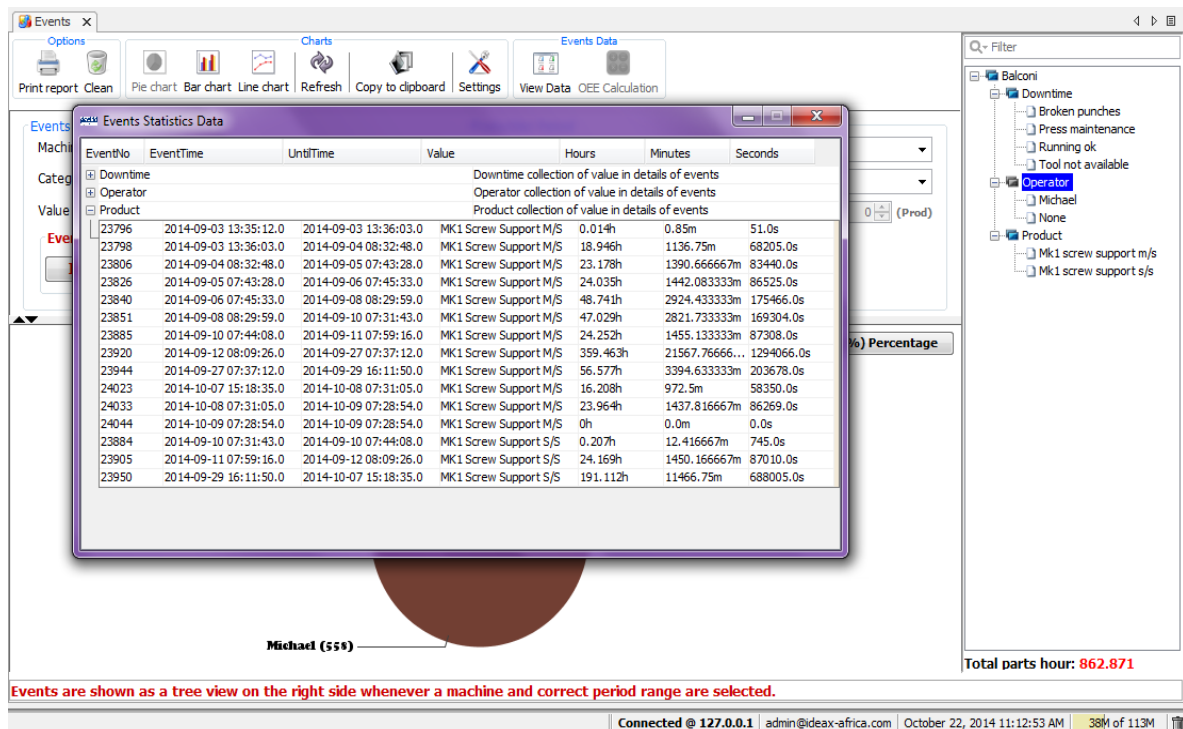


Figure 29: Events chart data

- Settings: available only for chart. Straightforward to use and see the results on the chart immediately.

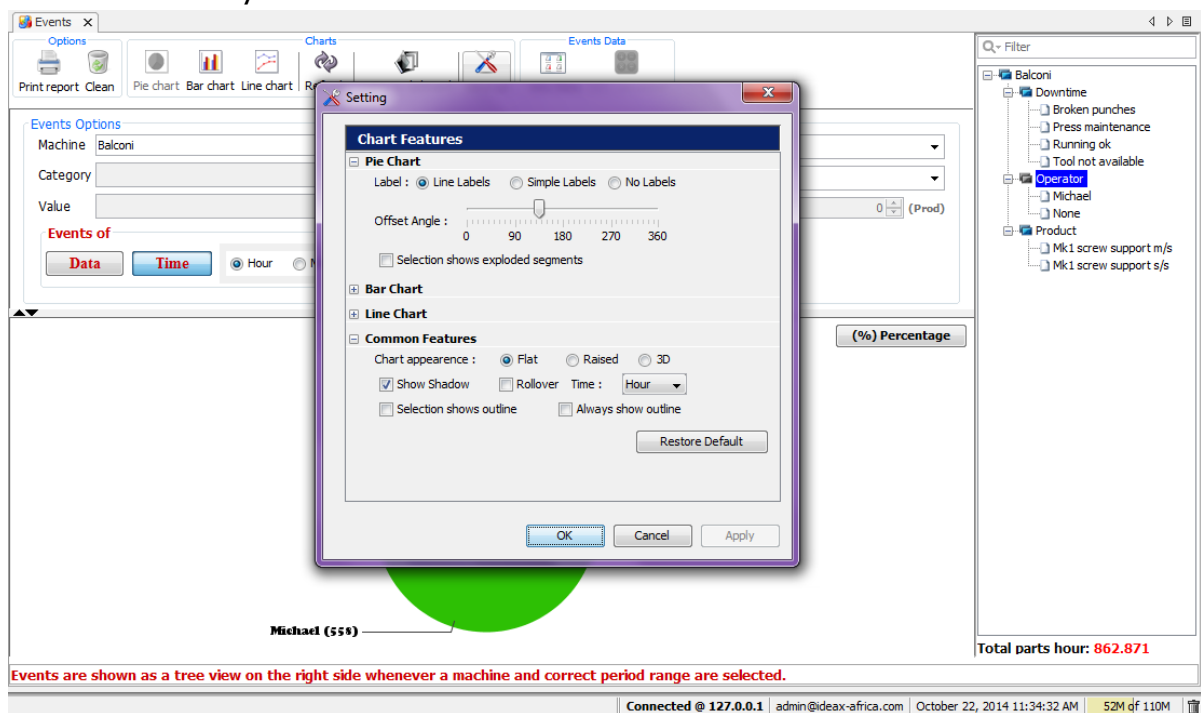


Figure 30: Events chart features

C- Production Quick View

The production quick view is designed to give the user in a straightforward way, the production of machines in the factory from the time it was configured with the SmartFactory hardware to the current time the interface loaded. The maximum view is within a year of time space.

The Production Quick View interface loads with the list of Machines and their targets. In case no machine or target is shown, clicking on the "Load Machine & Target" button will show the Targets Interface (refer to previous instructions) and exiting will populate the list.

The default tab where the information is shown is the "Total Production". To view the "Production rate" tab, click on the "Production rate" button of the toolbar.

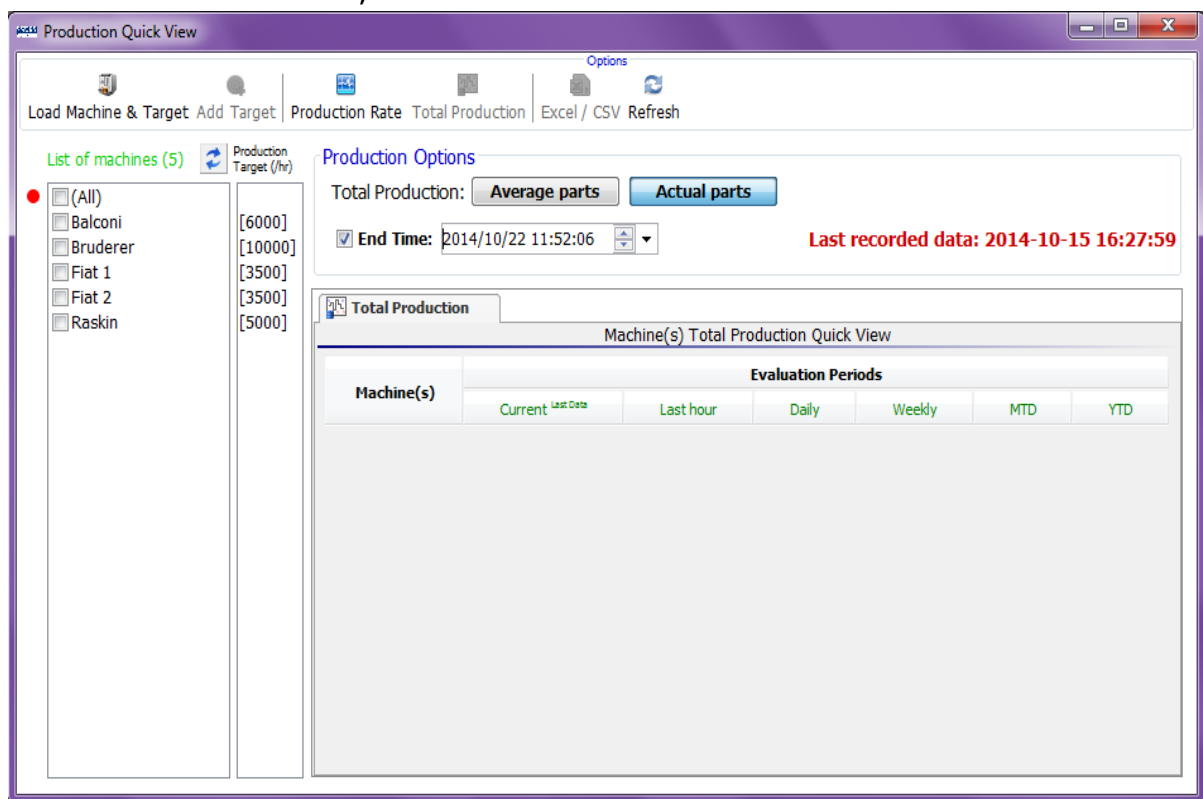


Figure 31: Production Quick View interface

Based on the End time value, selecting a machine or all the machines in the machine list, will calculate and show the results on the current selected tab. Targets calculations are made to show the user within the last hour if the target for a machine is on target (green), medium (amber) or less (red) (Figure 32).

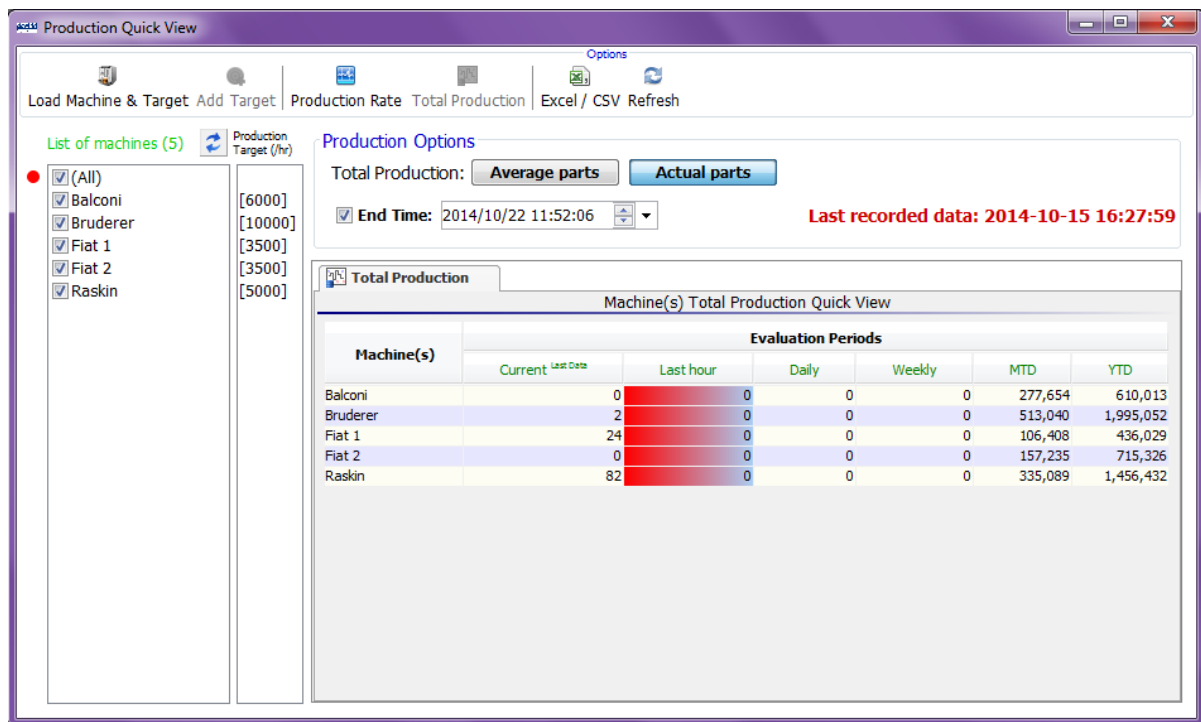


Figure 32: Machines Total production view

By default, but with the user ability to change (Figure 33), the target calculation within an hour is as below:

- **Green**: if the production value within the hour is greater or equal to 75% of the target.
- **Amber**: if the production value within the hour is in-between 50% and 75% of the target.
- **Red**: if the production value within the hour is strictly less than 50% of target.

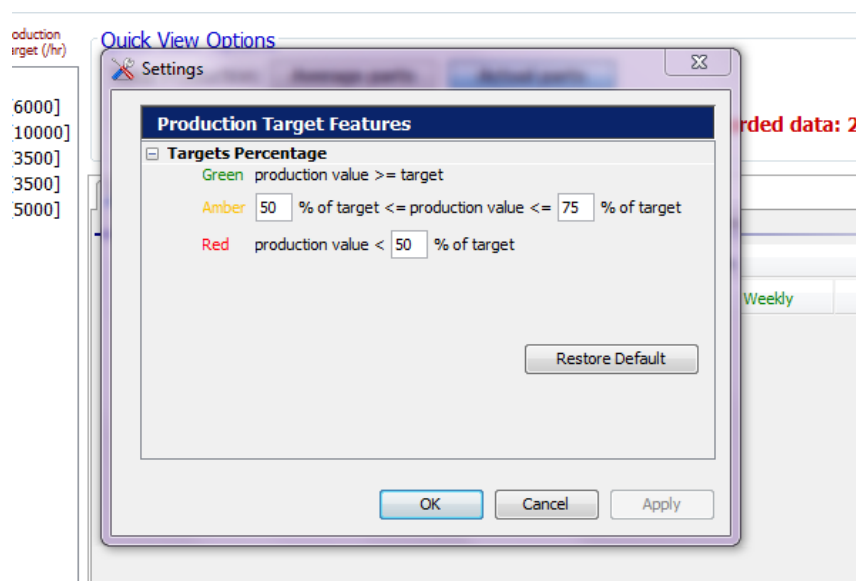


Figure 33: Targets Features

There is a possibility to view the data in Average or Actual parts for the Total Production and, in Parts/min or Parts/hr for the Production Rate.

The table columns are referred to the production data:

- Machines(s): the list of available machines.
- Current (last data): the last production data logged on that day.
- Last hour: data within the previous hour of the current time.
- Daily: data from 12 am up to the current time.
- Weekly: data from Monday to the current time.
- Month to day (MTD): data from the 1st day of the month up to the current time.
- Year to day (YTD): data from the 1st July (manufacturing production year).

Exporting the data in the table to an excel spreadsheet is also provided by clicking on the "Export Excel" button.

D- Dashboard

Clicking on the Main Menu of the SmartFactory Report Tool main interface or via mnemonic key (Alt+b), loads the Dashboard.

The dashboard was created to provide real-time feedback showing the users in the factory the current production or the status of machines. By this, it loads with the current day starting at 12 am. If production is ongoing through the day, automatically, all machines configured with the SmartFactory hardware load in the "Dashboard View" (Figure 34).

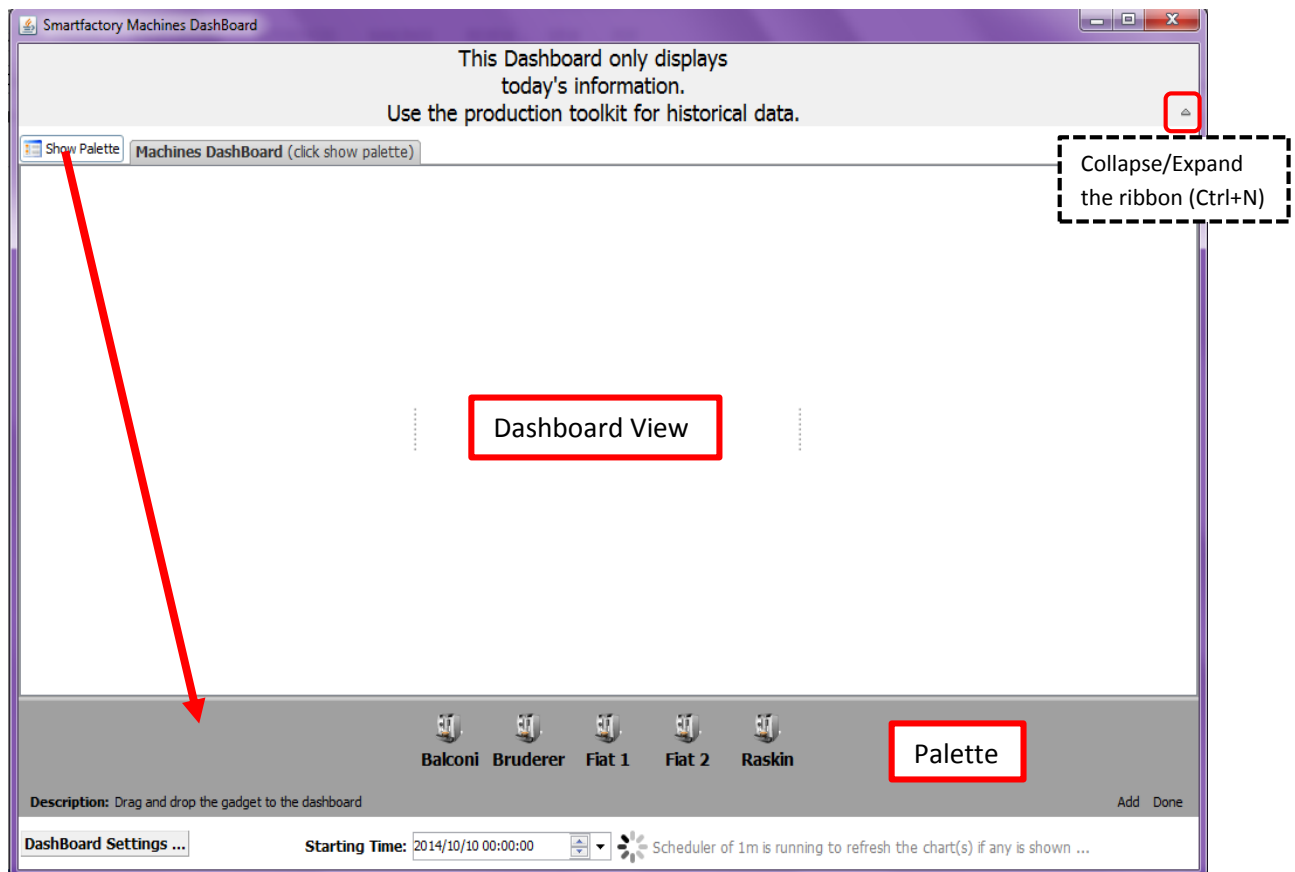


Figure 34: Dashboard

It may happen, that the machines do not load and the Dashboard palette is provided, listing the available machines. Specific and important messages that warn the user may appear in the process just as to guide on how to handle correctly the Dashboard.

- Palette:

A palette item/gadget (machine) can be placed onto the dashboard view either by dragging or the selecting the item and clicking on the palette "Add" button.

Palette's "Done" button hides the palette. Clicking on "Show Palette" shows the palette with items.



Figure 35: Dashboard chart gadget

Each machine shows the data in an hourly bar chart. A roller band is provided with the actual information of the machine mainly:

- Current Target: approximate calculation of the target within the next hour.
- Actual Value: the last visible total part numbers of the bar chart.
- Variance: +/- difference between the current target and the actual value.
- Operator: the logged operator's name.
- Downtime: the downtime event.
- Product: the current product in production.

- Dashboard Settings

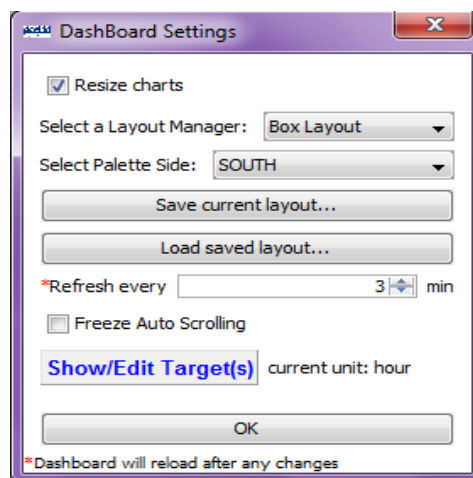


Figure 36: Dashboard settings

- Resize charts: ability to resize or not the gadget on the Dashboard View,
- Layout manager: plays role in the placing of gadgets in the Dashboard View
- Palette side: where the palette should appear on the Dashboard interface
- Save/Load current layout: the user has the ability to save the dashboard layout with display of machines in a chosen directory and to reload it anytime he/she wishes. It may not load if the day differs from the time it was saved. So make sure to give a meaningful name e.g. dashboard_15_10_2014 and adjust the Dashboard starting time to that day.
- Refresh time: time given in minutes for the charts to refresh itself with new data. Upon changing the time, exiting or clicking the "OK" button of this interface will reload the Dashboard for the new time setting to take effect.
- Freeze auto-scrolling: provided to freeze the roller band for all machines
- Show/Edit Targets: show the Target interface (see previous lines). Beside it is information about the current units of the target.

SmartFactory Report Tool Menus

Under File menu:

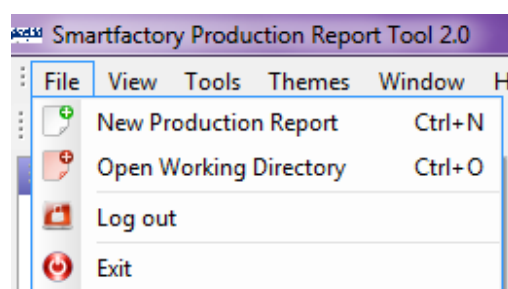


Figure 37: File Menu

- New Production Report: closes the application and restarts afresh the whole program.
- Open Working Directory: opens a specific created folder "SmartFactory Data" in the user's machine personal folder where some files are saved.
- Log out: closes and saves the application state thereafter showing the login interface.
- Exit: exiting the application.

Under View, Themes and Windows menus: all the items are for the look and feel of the application.

Under Tools menu:

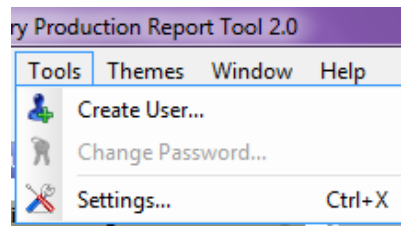


Figure 38: Tools menu

- Create User: see previous lines.
- Settings: application settings. Settings are straightforward, and do not require detailed explanation.

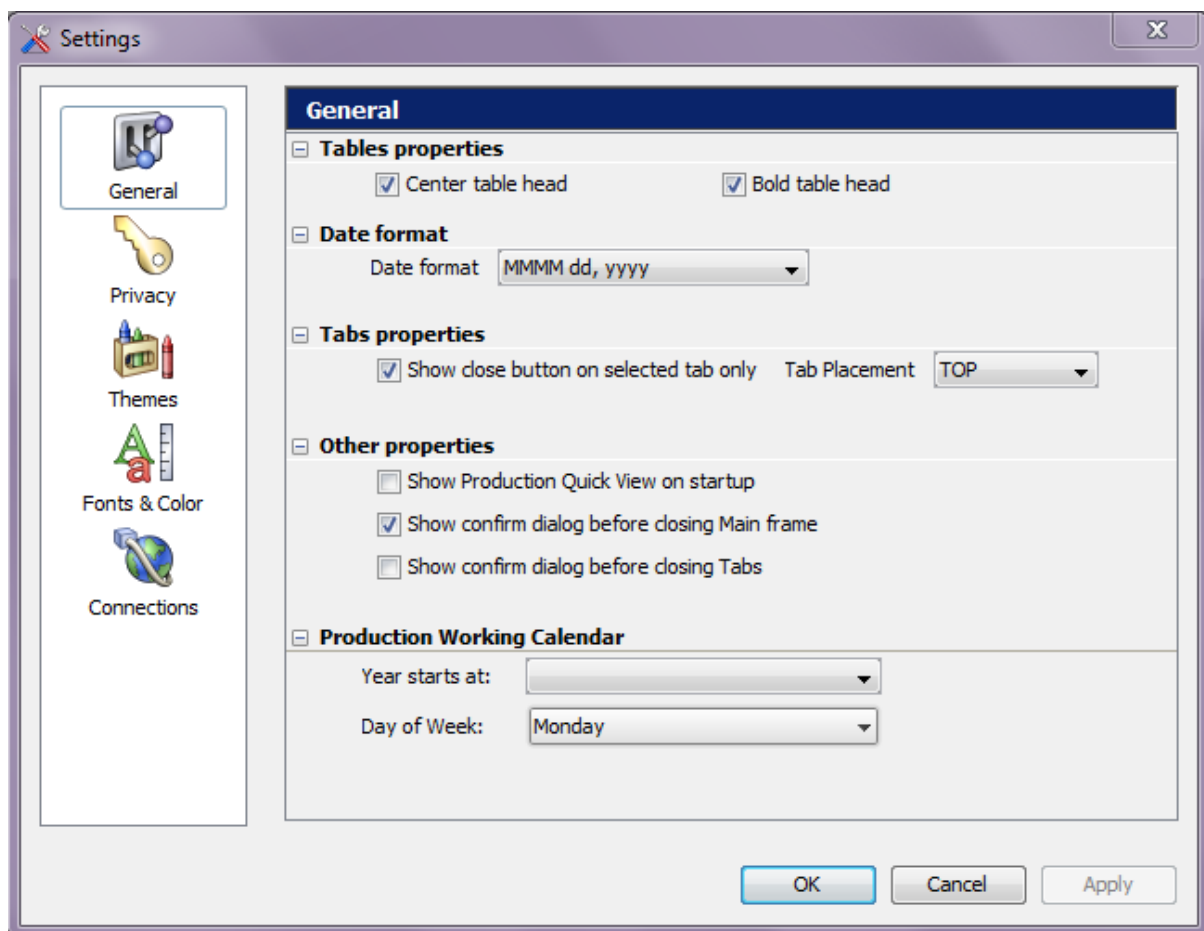


Figure 39: Application settings

Under Help menu:

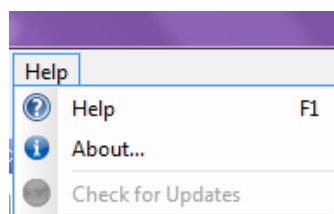


Figure 40: Help menu

Help: opens the current help document which is embedded in the application.

IV Conclusion

You may still find some bugs or glitches while running the application, please feel free to contact us as soon as possible. With your help, we shall build a great and competitive product to the satisfaction of users in the manufacturing market.