

Ctrl_GraphWindow user guide

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Ctrl_GraphWindow

The graphical data analysis window shows recorded data in a graphical form.

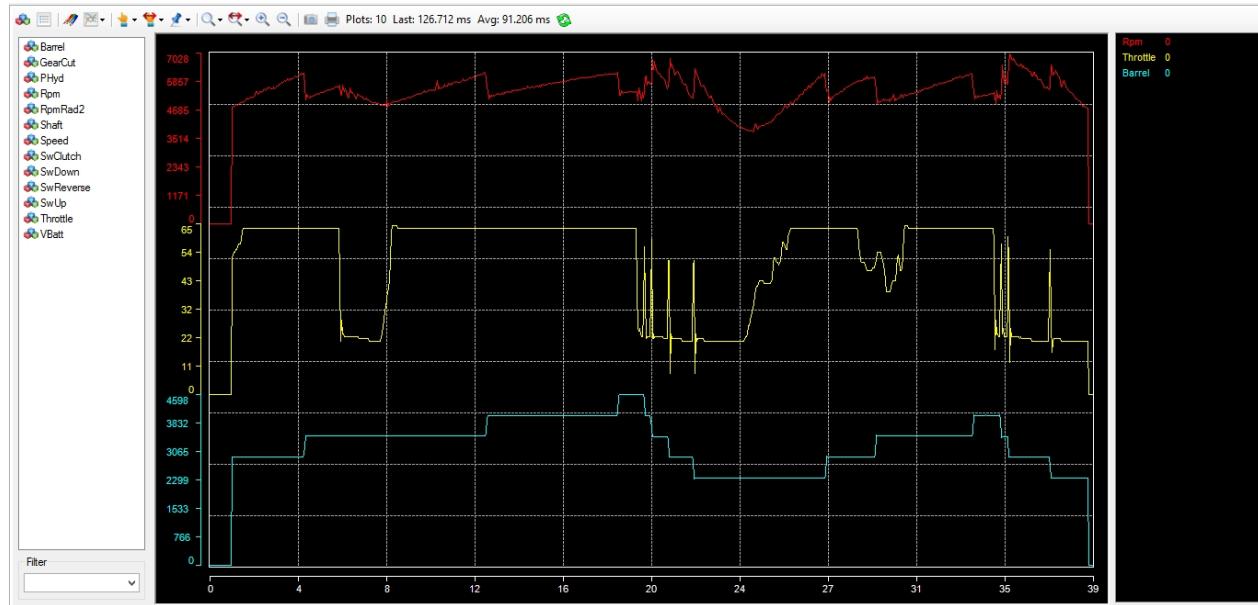
In addition of simply showing graphical data trace, the analysis window offers extensive tools such as zoom, cursors and statistics computation.

On the top of that, the graphical configuration of the analysis window is fully configurable run time. Through its intuitive configuration forms, it is possible for instance, to change the window back color or change the color of a data trace or even change its tracing mode just by simple clicks and without having to reload the data or reset the form.

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Analysis window presentation

Screen shot below shows a typical analysis window graphic drawn using default properties.



The analysis window has four main areas:

- The graphic where traces are drawn
- The [channel list](#), on the left, where all channels available in the loaded data file are displayed
- The [legend](#), on the right, where all channel plotted as well as their values, units and statistics are shown.
- The [tool bar](#), on the top, where all principal command of the graphic window are available

Analysis window tool bar

The analysis window tool bar is shown on the top of the graphic window form. It regroups main analysis window commands.

There are actually a lot more commands for the analysis windows spread into configuration forms and contextual menus.



Channel list: Show or hide the [channel list](#) panel

Legend: Show or hide the graphic [legend](#) panel

Graphic configuration: Open the main graphic configuration form

Graphic layout: Change the current graphic [layout](#) (Parallel, Overlay, Custom)

Cursor type: Change the current type of the [main graph cursor](#)

Cursor step: Change the current [cursor step](#) for key board arrows keys

Reference cursor: [Reference cursor](#) command (Set, Clear)

Zoom mode: Change the current [mode of zoom](#)

Zoom factor: Change the current [zoom factor](#) of 'Zoom plus' and 'Zoom minus' functions

Zoom plus: [Zoom plus](#) command

Zoom minus: [Zoom minus](#) command

Snapshot: Graphic [snapshot](#) command

Print: Graphic [print](#) command

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Analysis window shortcut keys

Here is a summary of all shortcuts keys of the analysis window.

Key	Function
+	Zoom plus
-	Zoom minus
W	Zoom min (0% zoom)
N	Zoom max (100% zoom)
X	Zoom mode X
Y	Zoom mode Y
B	Zoom mode XY
V	Cursor vertical
H	Cursor horizontal
K	Cursor cross
Pg Up	Cursor step +
Pg Down	Cursor step -
R	Set reference cursor
ESC	Clear reference cursor
O	Graph layout overlay
P	Graph layout parallel
C	Graph layout custom
G	Graph properties edition
T	Show/Hide legend selected series
DEL	Remove legend selected series from the graph

Data file

The data file format used by the analysis window is CSV (Column Separated Value)

Columns must be separated by a semi-comma character [;].

Values decimal separator must be point [.] or comma [,].

First line of the file contains names of data channels.

First column must be abscisse value (X axis values)

```
Time;Barrel;Rpm;Speed;Throttle;Shaft;RpmRad2;SwUp;SwDown;SwReverse;SwClutch;GearCut;PHyd;VBatt
1.008;2904;4759;118;51;-0.732;498.11;0;0;0;0;0;55;13
1.0095;2899;4769;120;52;-0.732;499.16;0;0;0;0;0;55;13
1.011;2899;4769;120;52;-0.732;499.16;0;0;0;0;0;55;13
1.0125;2899;4769;120;52;-0.732;499.16;0;0;0;0;0;55;13
1.014;2899;4769;120;52;-0.732;499.16;0;0;0;0;0;55;13
1.0155;2899;4754;120;52;-0.732;497.59;0;0;0;0;0;55;13
1.017;2899;4754;120;52;-0.732;497.59;0;0;0;0;0;55;13
1.0185;2899;4754;120;52;-0.732;497.59;0;0;0;0;0;55;13
1.02;2899;4754;120;53;-0.732;497.59;0;0;0;0;0;55;13
1.0215;2899;4754;120;53;-0.732;497.59;0;0;0;0;0;55;13
1.023;2899;4754;120;53;-0.732;497.59;0;0;0;0;0;55;13
1.0245;2899;4754;120;53;-0.732;497.59;0;0;0;0;0;55;13
1.026;2904;4754;120;53;-0.732;497.59;0;0;0;0;0;55;13
1.0275;2904;4754;120;53;-0.732;497.59;0;0;0;0;0;55;13
1.029;2904;4754;120;53;-0.732;497.59;0;0;0;0;0;55;13
```

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Analysis functions

This section regroup analysis features documentation of the graphic window

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Main cursor

The main graphic cursor is a graphical help for analysis. It permits to point any coordinates within the graphic area.

Just click anywhere in the graphic area to make the cursor visible. Press the mouse right button and move the mouse to have the cursor following your movements. Release the mouse right button and the cursor gets fixed.

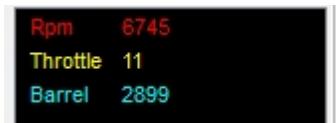
Default cursor type is 'Cross', which means that graphical cursor is taking a cross form.

There are actually seven cursor modes:

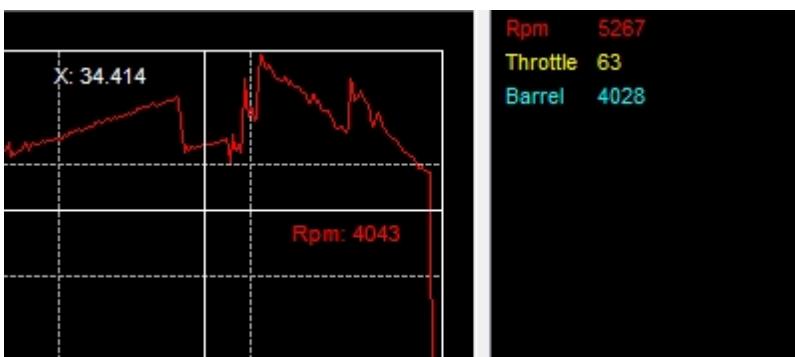
- None: Graphical cursor is disabled
- Vertical line: Cursor is a vertical line following the mouse along the X axis
- Horizontal line: Cursor is a horizontal line following the mouse along the Y axis
- Cross: Cursor is cross made by a vertical and a horizontal line, lines crossing each other at the mouse location
- Graticule: Cursor is a small cross following the mouse inside the graphic area
- Square: Cursor is a small square surrounding the actual mouse location
- Circle: Cursor is a small circle surrounding the actual mouse location

To change the cursor type, click on the 'Main graph cursor type' of the tool bar  and select the desired type. You can also use the 'Cursor' menu  of the graphic contextual menu (right click in the graphic area). 'Vertical line', 'Horizontal line' and 'Cross' are also available through keyboard shortcuts 'V', 'H' and 'K'.

While moving the graphic cursor, you can see in the [legend](#) that each trace value is updated with the actual value of the trace at the position of the cursor.

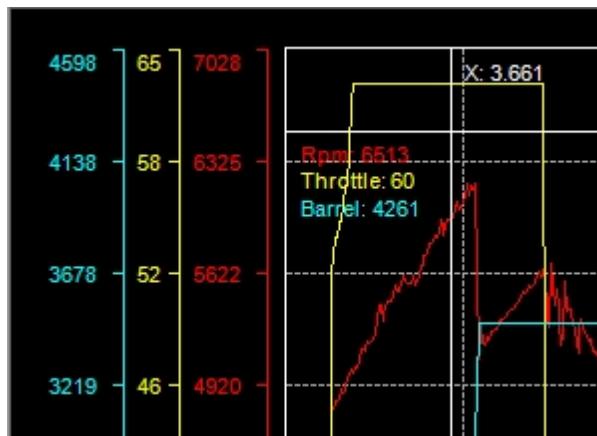


In addition of that, for 'Vertical', 'Horizontal' and 'Cross' cursor types, values of graphical coordinate are showed.



By coordinates, we mean X and Y axis values at the position of the cursor. For instance on the screen shot

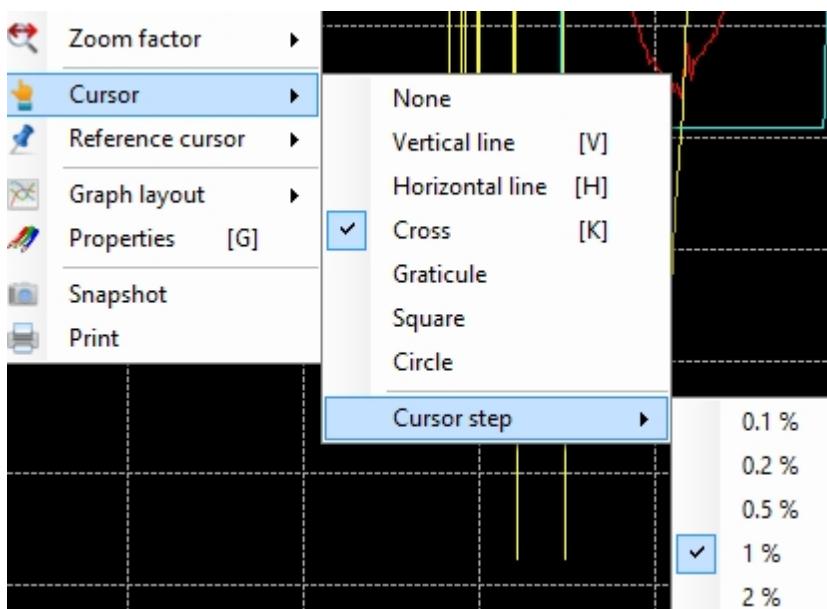
above, '34.414' is the value along the Xaxis and '4043' is the value along the Y axis which is named 'Rpm'. You may have more than one Y axis at the position of the cursor, in that case all axis values are showed.



Using 'left', 'right', 'up' and 'down' arrow keys of the keyboard you can move the cursor to the direction you want. Obviously, 'up' and 'down' movements are disabled for the 'Vertical line' cursor type, while 'left' and 'right' are disabled for the 'Horizontal line' type.

By setting the 'Cursor step' you can define how big (or small) cursor movement will be for each arrow key press event.

To change the cursor step, click the 'Main cursor step' button of the tool bar and select the step you want. This command is also available through the graphic contextual menu, under the 'Cursor \ Cursor step' menu. You may also use 'Page Up' and 'Page Down' keys to change the cursor step.



Cursor step values are percentage values... OK but percentage of what ? Good question !

Step values are percentage of the current Xaxis values span. For example, if 100 seconds of data are plotted and the cursor step is 1%, the cursor will move by step of 1 second.

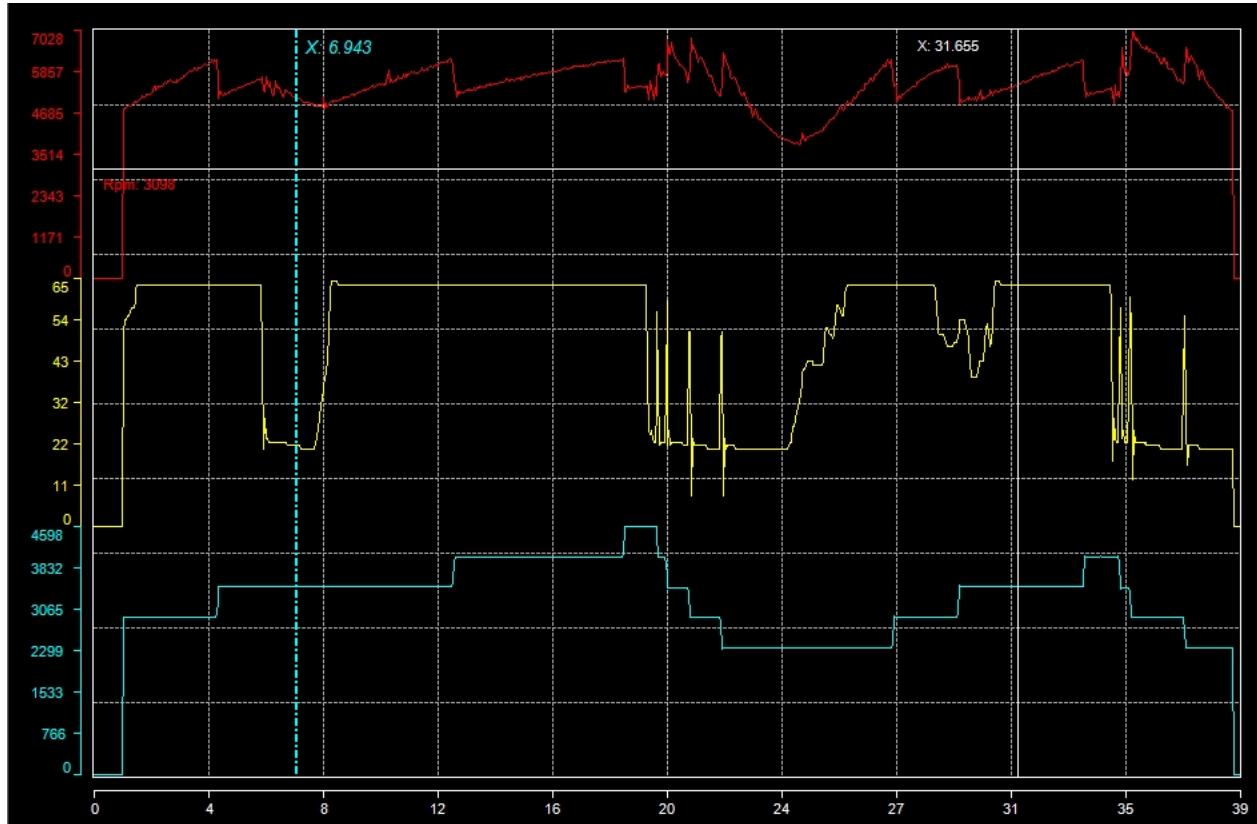
For Y axis, since it could be several different values here, screen size is used as reference value. In other words, with a cursor step of 1%, cursor will move up and down by steps representing 1% of the screen size.

Graphical properties of the graphic cursor (color, size) can be adjusted through the graphic configuration form. Please check the '['Cursors properties'](#)' section for more details.

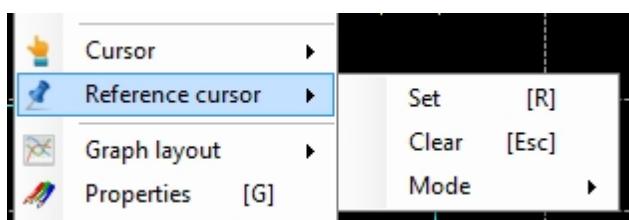
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Reference cursor

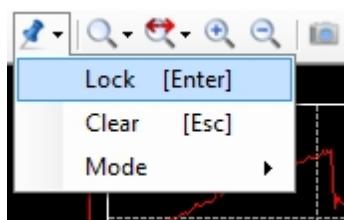
The reference cursor is an extension of the '[Main cursor](#)' function. It permits to compare values of all traces between two particular points in the graphic.



Click on the 'Reference cursor \ Set' menu of tool bar to set the reference cursor position. This function is also accessible in the 'Reference Cursor\Set' command of the graphic window contextual menu, or by pressing the 'R' key of the keyboard.



Place the reference at the position of your choice and then click the 'Reference cursor \ Lock' command of the tool bar or the 'Reference Cursor\Lock' command of the graphic window contextual menu, or by press the 'Enter' to lock the reference cursor position and get the main cursor back on.



Main cursor being back, it can be place anywhere in the graph in order to compare the main cursor value and the reference cursor value.

Finally, once done with the comparison, click the 'Reference cursor \ Clear' command of the tool bar or the 'Reference Cursor\Clear' command of the graphic window contextual menu, or by press the 'Escape' to clear the reference cursor.

The biggest benefit of the reference cursor is that it shows both reference and main cursor values in the [legend](#), leading to have a direct cursors value comparison.



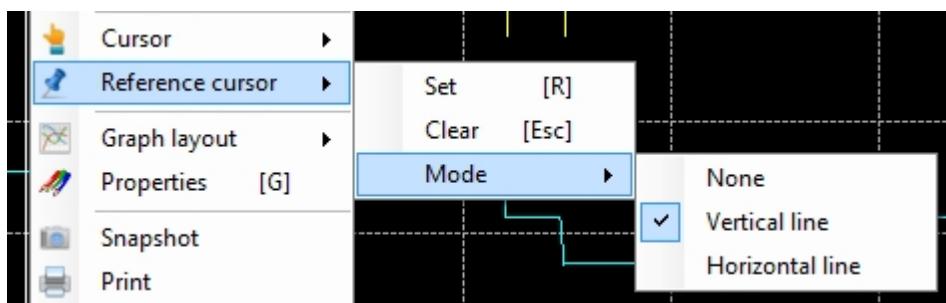
When the reference cursor is active, four statistics are added to the legend:

- Reference cursor value: The actual value of the trace at the reference cursor position
- Reference cursor value difference: The difference in value between the main and the reference cursor
- Reference cursor value difference percentage: The difference in percentage of the reference value between the main and the reference cursors values
- Reference cursor gradient: Value the gradient between the main and the reference cursor values. Gradient being defined as the difference in value over cursors X axis values difference.

There are three kinds of reference cursor:

- None: Reference cursor is disabled
- Vertical: Reference cursor is a vertical line. This mode is intended to be used with any main cursor type except the 'Horizontal line' main cursor type.
- Horizontal: Reference cursor is a horizontal line. This mode is intended to be used with any main cursor type except the 'Vertical line' main cursor type.

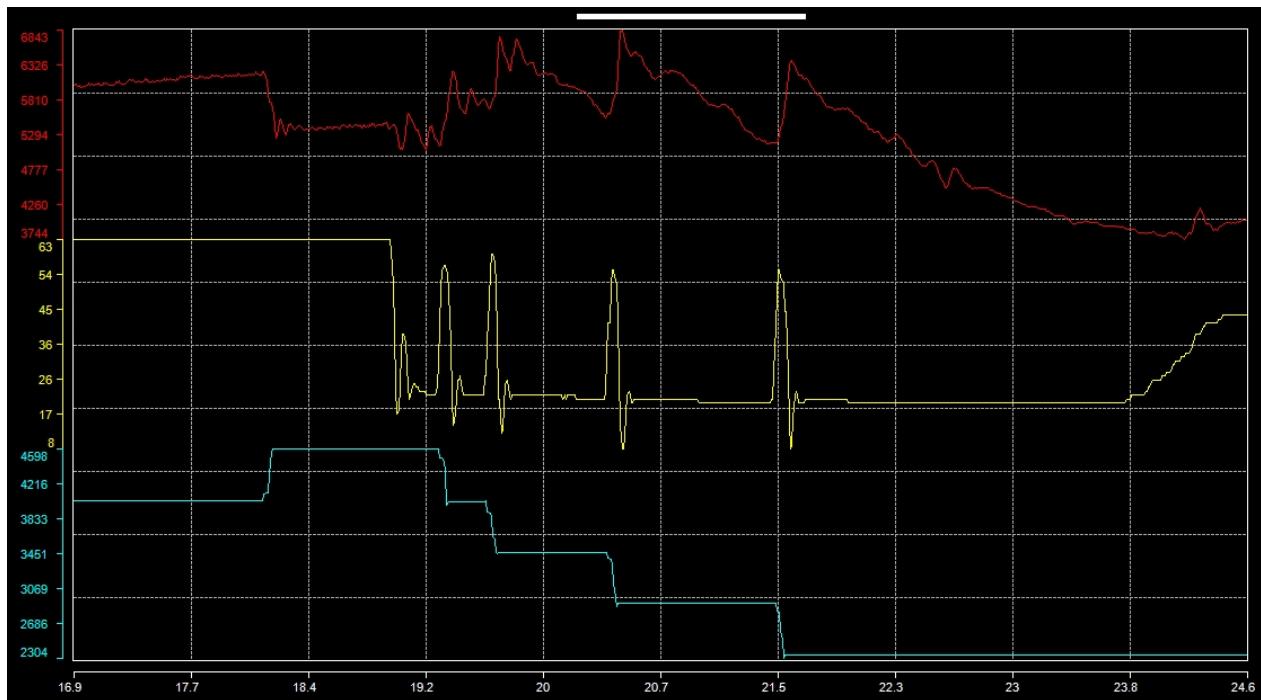
Use the 'Reference cursor \ Mode' command of the tool bar or the 'Reference Cursor\Mode' command of the graphic window contextual menu to change the current reference cursor type.



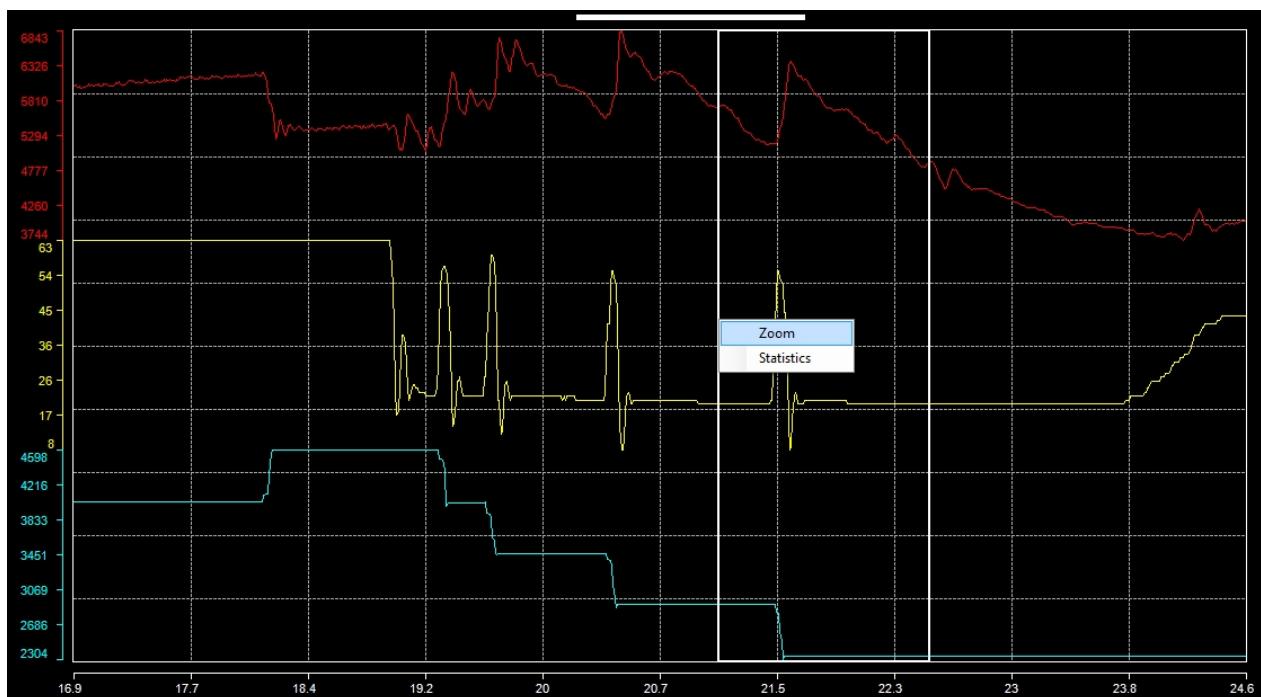
As per the main cursor, the reference cursor aspect can be customized in the graphic configuration form. Please check the ['Cursors properties'](#) section for more details.

Zoom

As per its name definition, zoom is a function permitting to zoom a particular graphic area and see traces of this area with greater details.



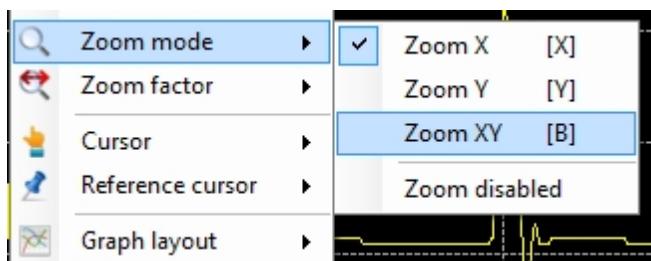
To zoom a particular area of the graphic, place the mouse cursor at the beginning, or at the end, of the area you want zoom in. Press the right mouse button and then drag the zoom box up the end of the zoom area. When the zoom area is defined click the 'Zoom' command of the contextual menu that pops up on the right mouse button release.



Four different zoom modes are available:

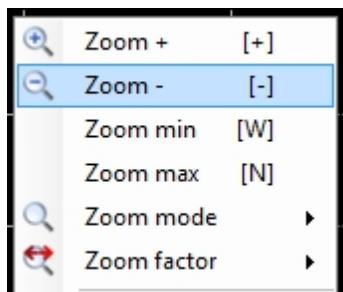
- Disabled: Zoom function is disabled
- Zoom X: Zoom is performed along the X axis only, Y axis being unchanged.
- Zoom Y: Zoom is performed along the Y axis only, X axis being unchanged.
- Zoom XY: Zoom is performed along both X and Y axis.

To switch to a different zoom mode, click the 'Zoom Mode'  command of the tool bar or the 'Zoom mode'  command of the graphic window contextual menu.



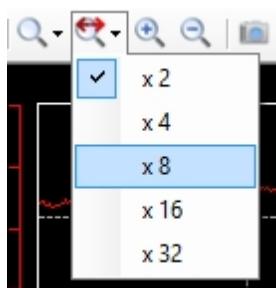
An alternative solution is to use zoom mode shortcut keys 'X', 'Y', 'B' for 'Zoom X', 'Zoom Y' and 'Zoom XY'

Another way to zoom a graphic in and out is to use 'Zoom +'  and 'Zoom -'  functions. Both of those functions are available either in the tool bar or in the graphic window contextual menu. They are also accessible by pressing '+' and '-' keys of the keyboard for 'Zoom +' and 'Zoom -'.



With this kind of zoom, the zoom area is defined by a factor applied around the [main graphic cursor](#) position. If the main graphic cursor is not set, the center of the screen is used as reference position.

The zoom factor can be defined either through the 'Zoom factor'  button of the tool bar or through the 'Zoom factor'  item of the graphic window contextual menu.



The zoom factor value represents the magnitude of zoom as a function of X axis values span (for zoom X and zoom XY) and the screen height (for zoom Y and zoom XY).

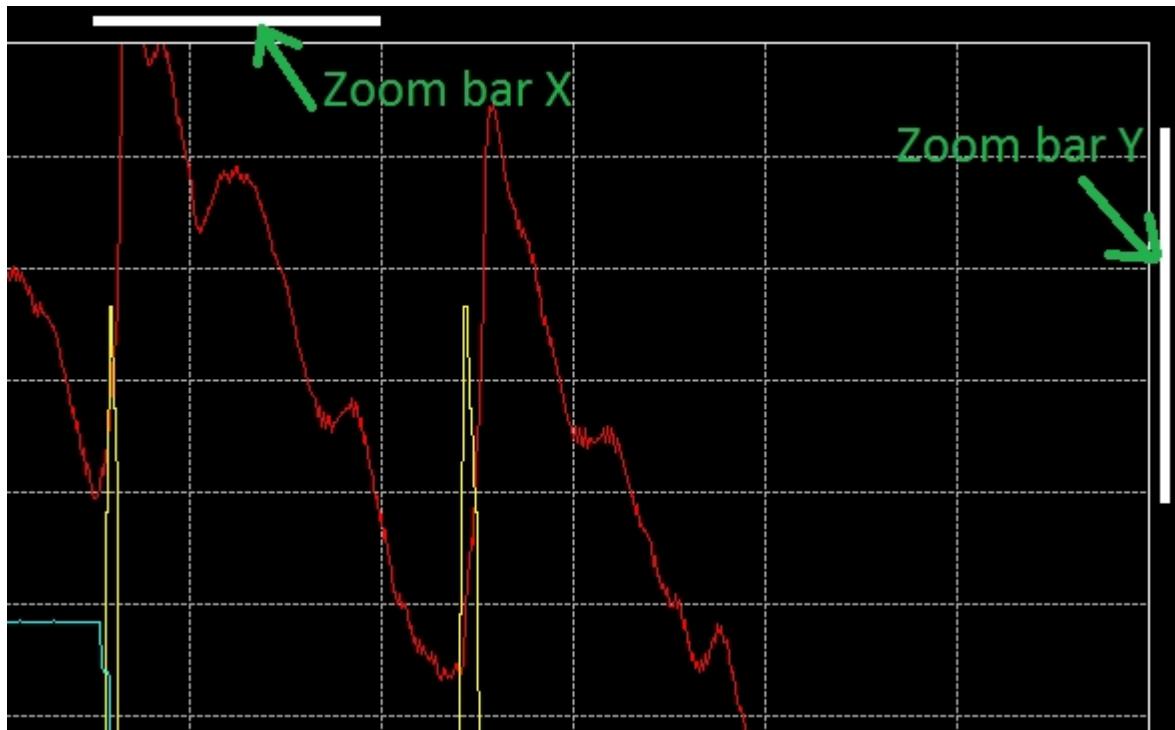
For example, if 80 seconds of data are plotted and the zoom factor is set to 'x 8', in the case of the 'Zoom X' mode, the Xaxis values span resulting of the zoom will be eight time smaller than the original span. So $80 / 8 = 10$ sec.

In the case of a zoom out, the X axis values span will be eight time bigger than the original one. So $10 \times 8 = 80$ sec.

The third and last method to zoom in and out is to use 'Zoom min' and 'Zoom max' functions. Those functions are not available in the tool bar (for clarity) but they are in the graphic window contextual menu and through the shortcut keys 'W' and 'N' for 'Zoom min' and 'Zoom max'.

The 'Zoom min' will revert to a zoom magnitude of 1, so the whole data will be shown as if there wasn't any zoom. While 'Zoom max' will do the exact opposite and apply the biggest zoom factor (x 32).

While the zoom function is operating, X and Y zoom bars are shown.



Obviously, the 'Zoom bar X' is shown only if the X axis is zoomed, so it won't be shown in 'Zoom Y' mode and the 'Zoom bar Y' is shown only if the Y axis is zoomed, so it won't be shown in 'Zoom X' mode.

Those zoom bars indicate two things:

- The magnitude of the zoom: bar width (for the zoom bar X) and bar height (for the zoom bar Y) are function of the zoom magnitude.
If the zoom factor is set to 'x 8', zoom bar X width will be eight time smaller than the whole graphic area width. The same logic is used for the zoom bar Y, with a zoom factor of 8, zoom bar Y height will be eight time smaller than the whole graphic area height.
- The position of zoomed area: bar left position (for zoom bar X) and bar top position (for the zoom bar Y) are function of the zoomed area position
if the whole data length is 60 seconds and the zoom area starts at the second 30, zoom bar X left position will right on the middle of the graphic area. The same logic applies as well for the zoom bar Y.

Zoom bar X and Y have also second purpose, they can be moved by user in order to move the zooming area.

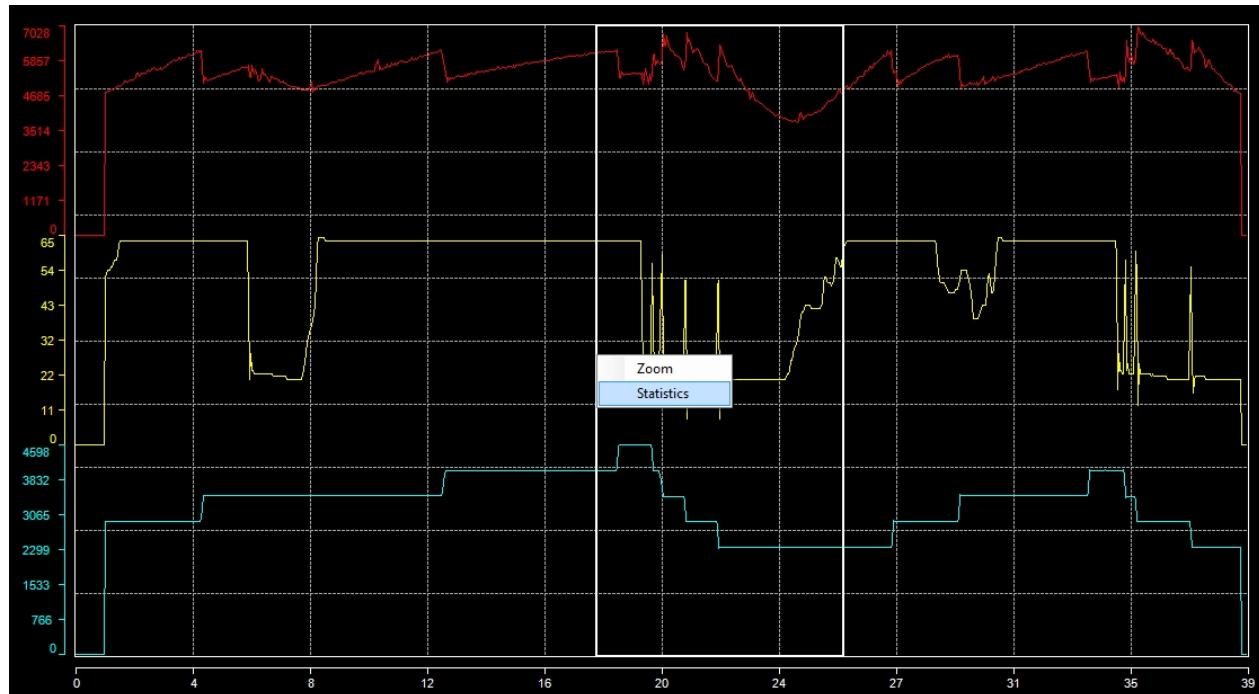
Place the mouse cursor over one zoom bar and the cursor will transform either in 'east-west arrows' cursor

for the zoom bar X or in 'north-south arrows' cursors for the zoom bar Y. Press the mouse right button and drag the zoom bar at the position you want to change the zooming area.

Statistics

Another useful feature of the analysis window is statistics computation.

As per the [zoom](#) function, right click is graphic area and drag the zoom box up to end of area in which you want compute statistics. Release the mouse right button and click the 'Statistics' command of the contextual menu that has popped up. Prior to do that, make sure the zoom mode is not 'Zoom disabled', otherwise the zoom box will not appear.



The statistics window appears

Series statistics								
Label	Min X	Min	Max	Max X	Avg	Avg Abs	Std dev	Samples
Rpm	24.172	3744	6843	20.486	5166.192	5166.192	844.217	5515
Throttle	20.486	8	63	17.451	34.737	34.737	17.472	5515
Barrel	21.546	2304	4598	18.506	3040.783	3040.783	850.912	5515

In this statistics windows we can find different statistics about plotted data

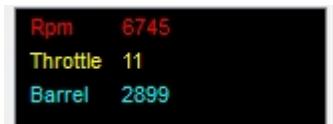
- Min X: X axis value at the minimum trace value
- Min: Minimum value of the trace inside the zoom box
- Max: Maximum value of the trace inside the zoom box
- Max X: X axis value at the maximum trace value
- Avg: Average of all trace values inside the zoom box
- Avg abs: Average of all trace absolute values inside the zoom box
- Std dev: Standard deviation of all trace values inside the zoom box
- Samples: Trace samples count used for statistics computation

Those statistics can even be copied into the Windows clipboard in order to be pasted into an external application such as Microsoft Excel.

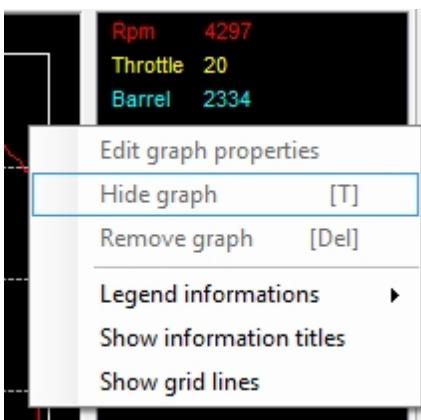
Select all cells of the statistics grid that are of your interest and press Ctrl+C on your keyboard. All selected cells values are now in the Windows clipboard and are ready to be used in any application accessing the clipboard.

Legend

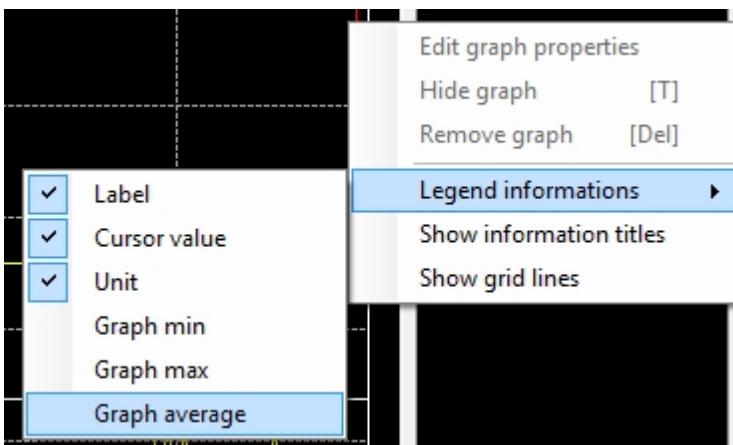
As briefly explained in the '[Main cursor](#)' and '[Reference cursor](#)' sections, legend shows plotted trace values at the position of the main [cursor](#).



If you make a right-click on the legend, the legend contextual menu will pop up and shows all available legend options



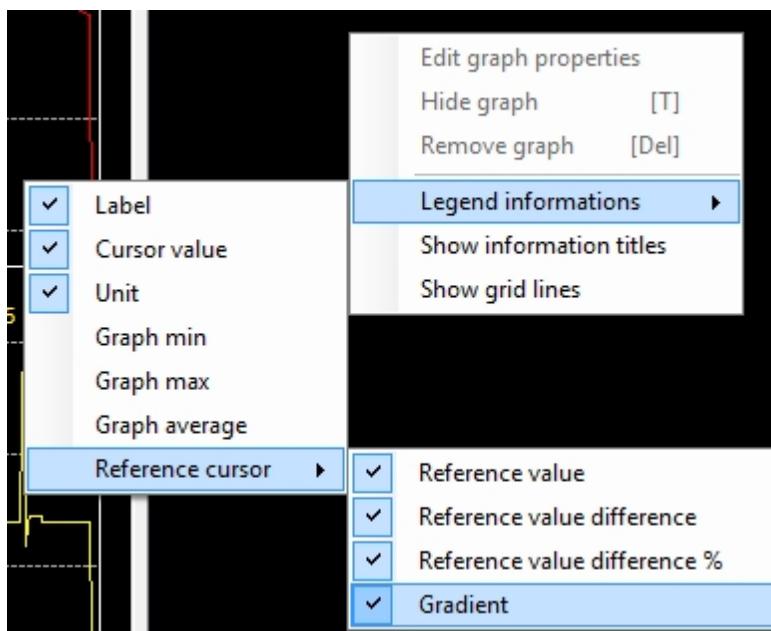
The 'Legend information' menu propose you to define what information you want to see in the legend.



There are six information that you can make visible or invisible. Just check infos that you want to see, unchecked info will be invisible.

- Label: Titles of the graphic traces set into the graphic configuration form
- Cursor value: Traces values at the position of the [main cursor](#)
- Unit: Trace units set into the graphic configuration form
- Graph min: Traces minimum value visible in the graphic area
- Graph max: Traces maximum value visible in the graphic area
- Graph average: Traces average value of all sample visible in the graphic area

In case of the [reference cursor](#) function usage, there are an extra bunch of infos that you can make visible.

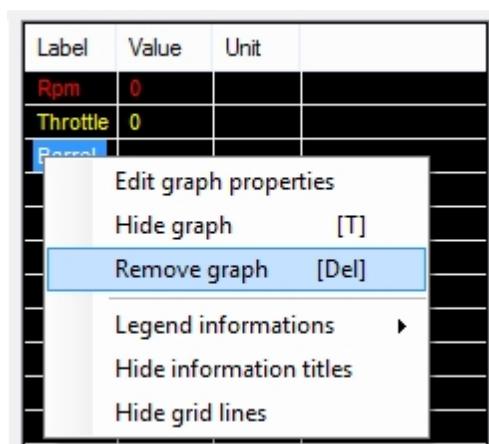


- Reference cursor value: The actual value of the trace at the reference cursor position
- Reference cursor value difference: The difference in value between the main and the reference cursor
- Reference cursor value difference percentage: The difference in percentage of the reference value between the main and the reference cursors values
- Reference cursor gradient: Value the gradient between the main and the reference cursor values. Gradient being defined as the difference in value over cursors X axis values difference.

Menus 'Show legend information titles' and 'Show grid lines' permit to show and hide the legend header and legend grid lines.

Label	Value	Unit	
Rpm	0		
Throttle	0		
Barrel	0		

A right-click on a legend item will enable trace related function of the legend



Menu 'Edit graph properties' will open the selected trace 'Detailed serie properties' windows in order to fine

tune graphical properties of a particular trace.

'Hide graph' command will hide the selected trace in the graphic area. Alternatively, once a trace hidden, this menu becomes 'Show graph' in order to re-enable a hidden trace. This command is also available by pressing the 'T' key of the keyboard.

'Remove graph' will definitively remove a trace from the graphic area. Be careful, this operation is not reversible ! Once a trace removed it is gone for ever and you will have to add it into the graph again.

The legend panel can be hidden at any time by clicking the 'Show/Hide legend' button  of the tool bar. Once hidden click again the 'Show/Hide legend' button  to re-open the legend panel.

Some more legend properties can be adjusted through the graphic configuration form. Please check the ['General properties'](#) section for more details

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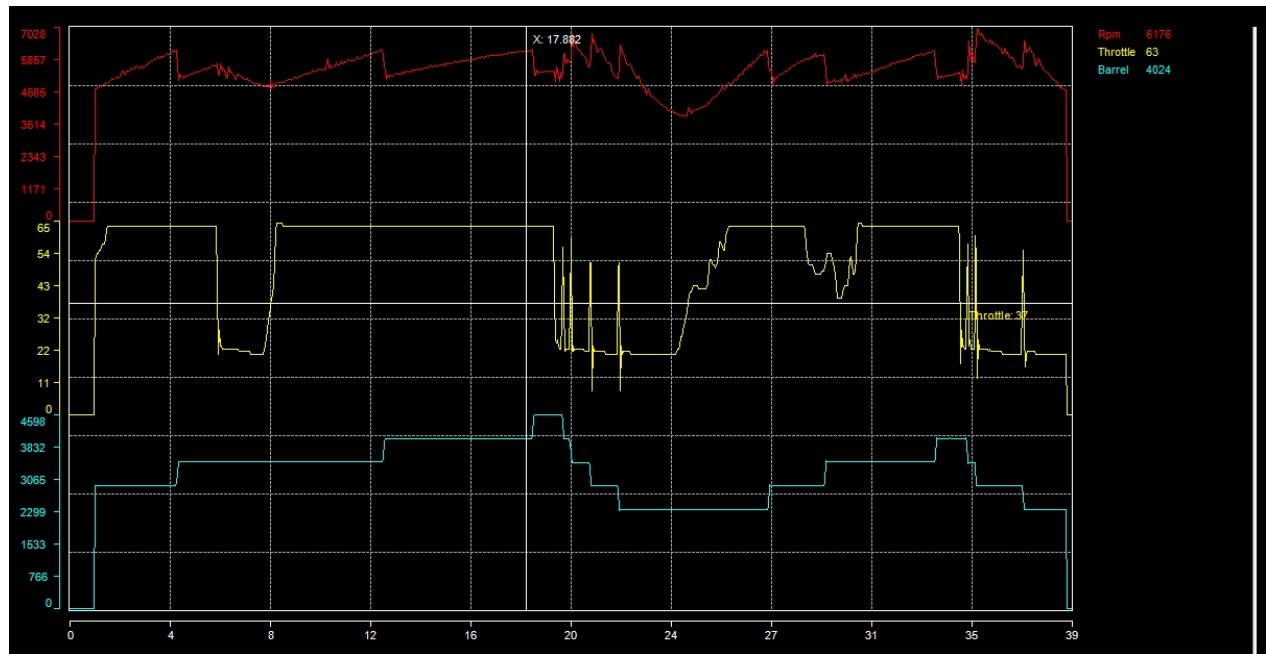
Snapshot

Snapshot function makes a picture of your graphic that can be reused in a presentation, or an email or anything else.

Snapshot outputs a bitmap picture file (*.bmp), this picture including legend but excluding the channel list.

To make a snapshot of your graphic, simply click the 'Make a snapshot image of the graphic' , set the name and path of the output picture in the file saving dialog and click 'Save'.

Example of a graphic snapshot.

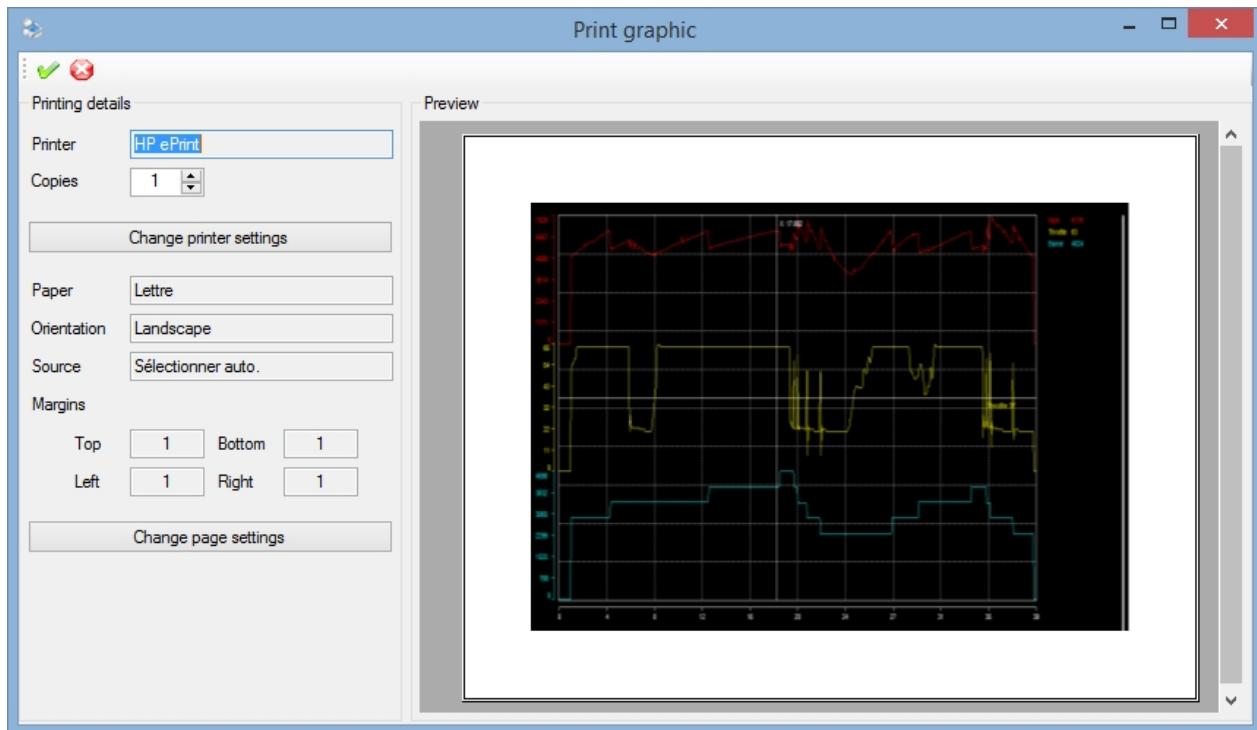


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Print

The 'Print' function permits to print your graphic out.

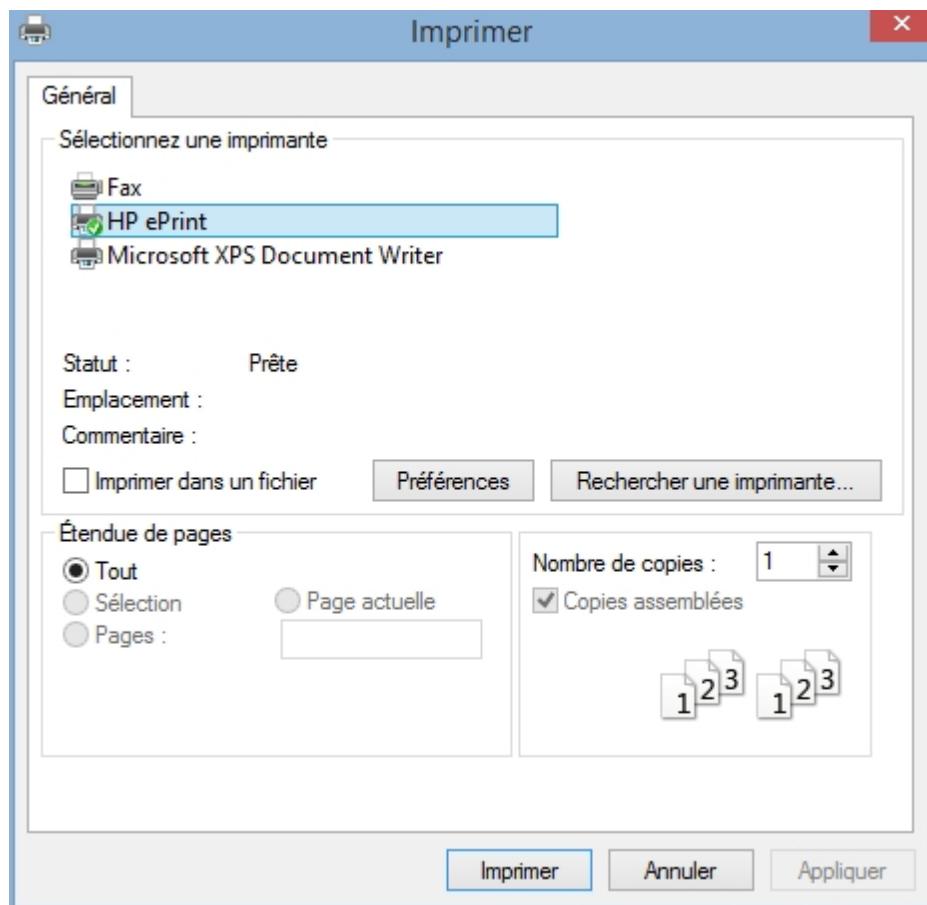
Click the 'Print graphic'  button to open the print preview window.



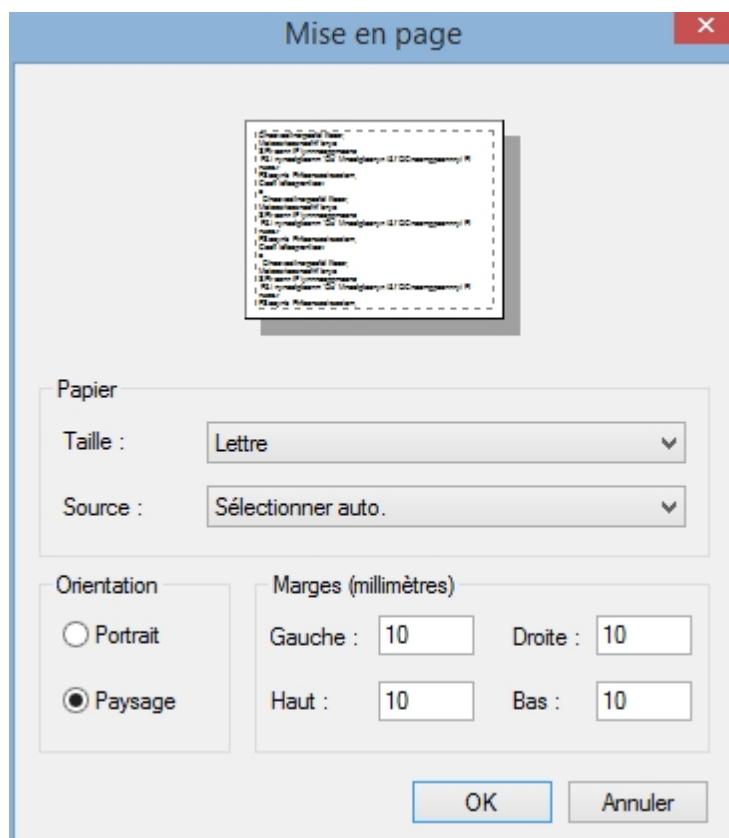
The right side panel of print preview form contains printing details such as printer name, number of copies, paper format and orientation.

The left side panel shows an actual preview of the document as it will be once printed out.

Set the number of copies to print in the field 'Copies'. To change the printer and its properties, click the 'Change printer settings' button.



Click the 'Change page settings' button to change paper orientation or adjust margins.



Once done with all settings, click the 'Print'  button to print the page.

The 'Cancel'  button, simply close the form. It doesn't cancel the printing request if such request has been sent to a printer.

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Graph window settings

This section regroup graphical properties configuration documentation of the graphic window

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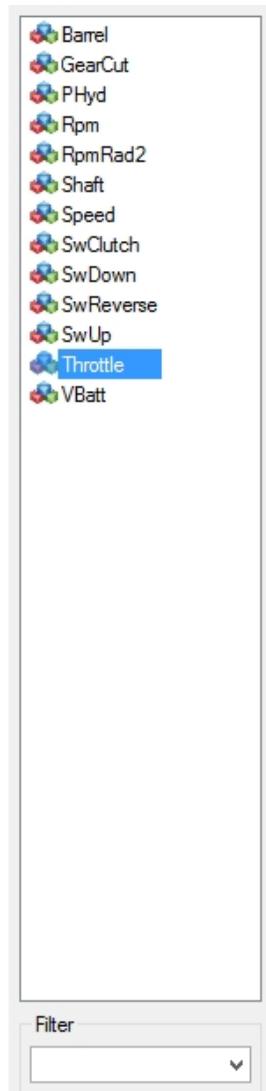
Channel list

The channel list shows the list of data channels contained in the [data file](#) loaded.

Channel list is located in the left side panel of the analysis window. It is visible by default but it can be hidden by clicking on the 'Show/Hide channel list'  button of the tool bar. Once hidden, click again on this button to get the channel list back.

Double click on a channel to add it in the graphic. This can also be done by a 'drag & drop' of a channel (or a bunch of channels) from the channel list to the graphic area.

Alternatively, select channels that you want to add in the graphic and press 'Enter'.

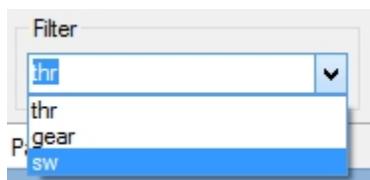


At the bottom of the channel list there is the 'Filter' area. This area permits to filter channel names shown in the list. Just type a name or a part of a name that you are looking for and press enter. If the character string

that you typed in is contained into one or more channels, only those channels will be shown in the list.



Filter is text box is actually a list that stores the last ten filters used. Just select that filter to reuse it.



Clear the filter text box to reset the filter and get back the whole channel list.

Graphic layout

Term 'graphic layout' means the way graphic series (or traces) are set into the graphic.

There are three possible layouts:

- Overlay: All series are overlaying each other on the full graphic area height.
- Parallel: Series are evenly arranged onto the graphic area.

If there are four series to plot, each serie will be plotted over 25% of the whole graphic area height. If there are five series, each serie will use 20% of the graphic height, 10% for ten series, so forth and so on...

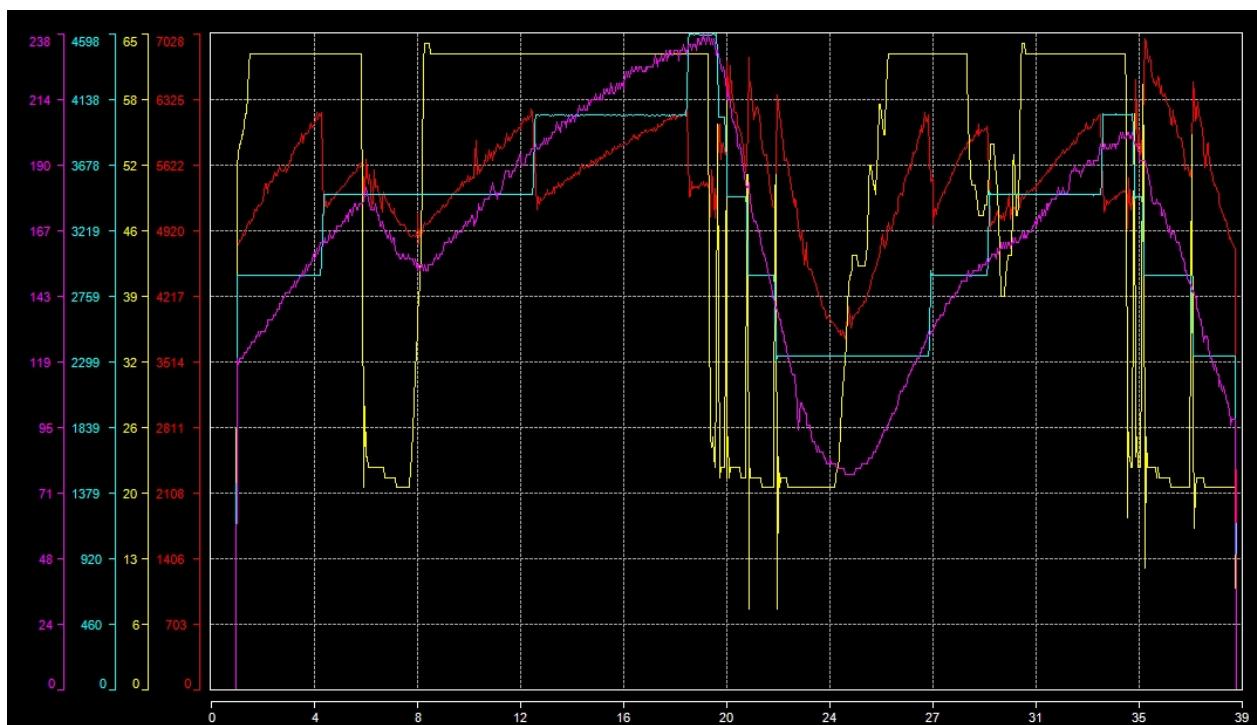
- Custom: Series top and bottom position are defined by the user.

Series are not necessarily evenly set, a serie can fully or partially overlap one or more series.

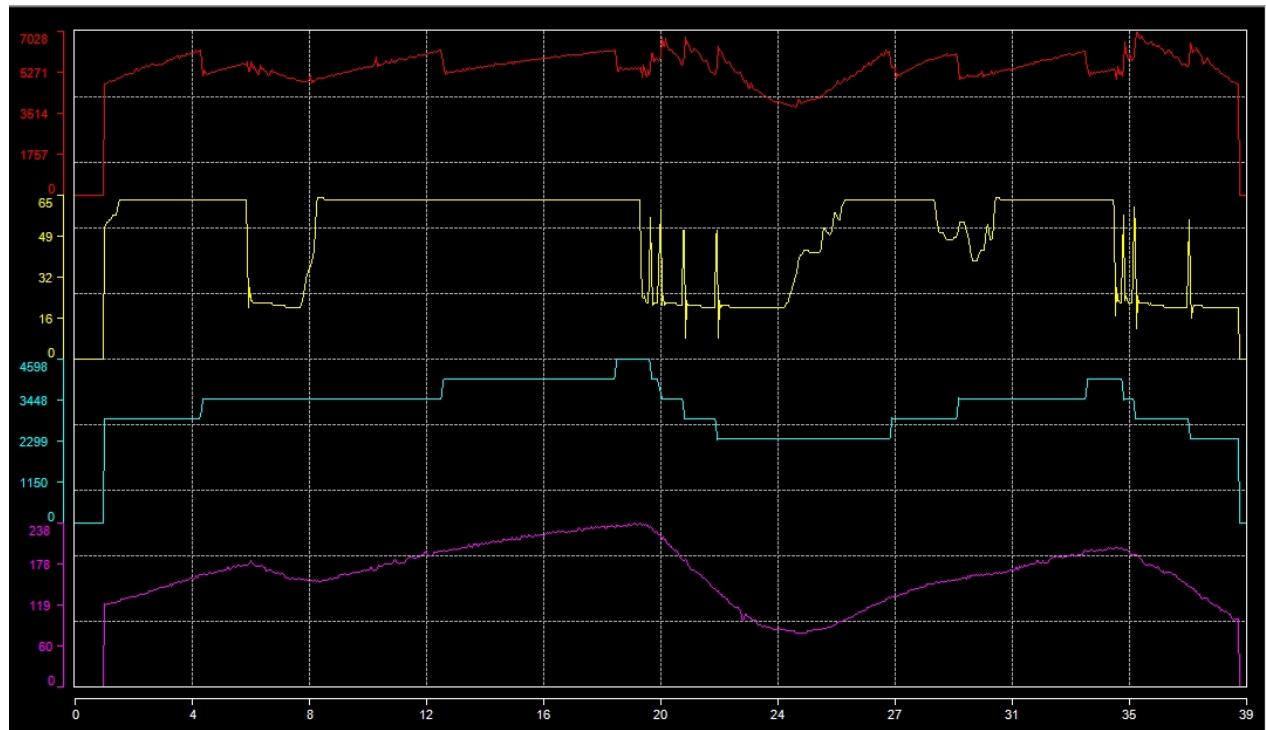
Click the 'Graphic layout mode'  button of the tool bar to change the current layout. This command is also available through the 'Graph layout'  item of the graphic contextual menu.

Layout mode can also be changed using 'O', 'P' and 'C' shortcut keys for 'Overlay', 'Parallel' and 'Custom' modes.

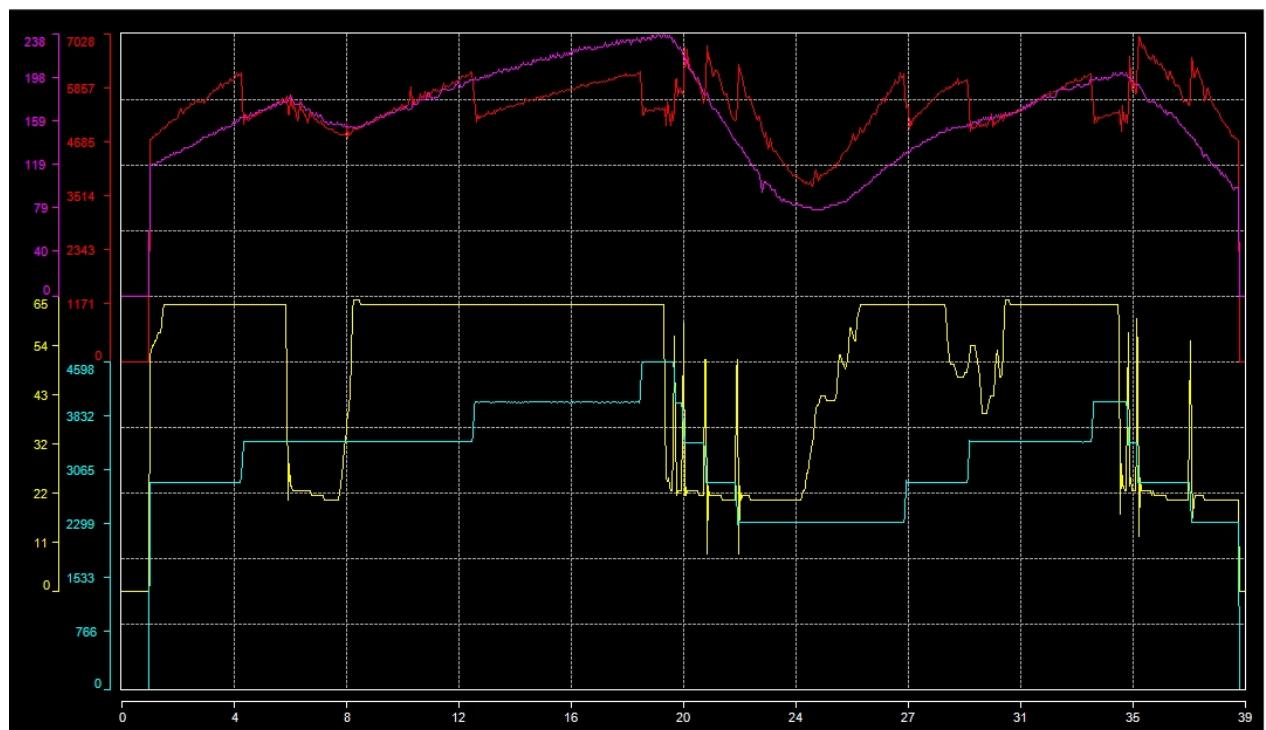
Graphic in 'Overlay' layout mode:



Graphic in 'Parallel' layout mode:



Graphic in 'Custom' layout mode:

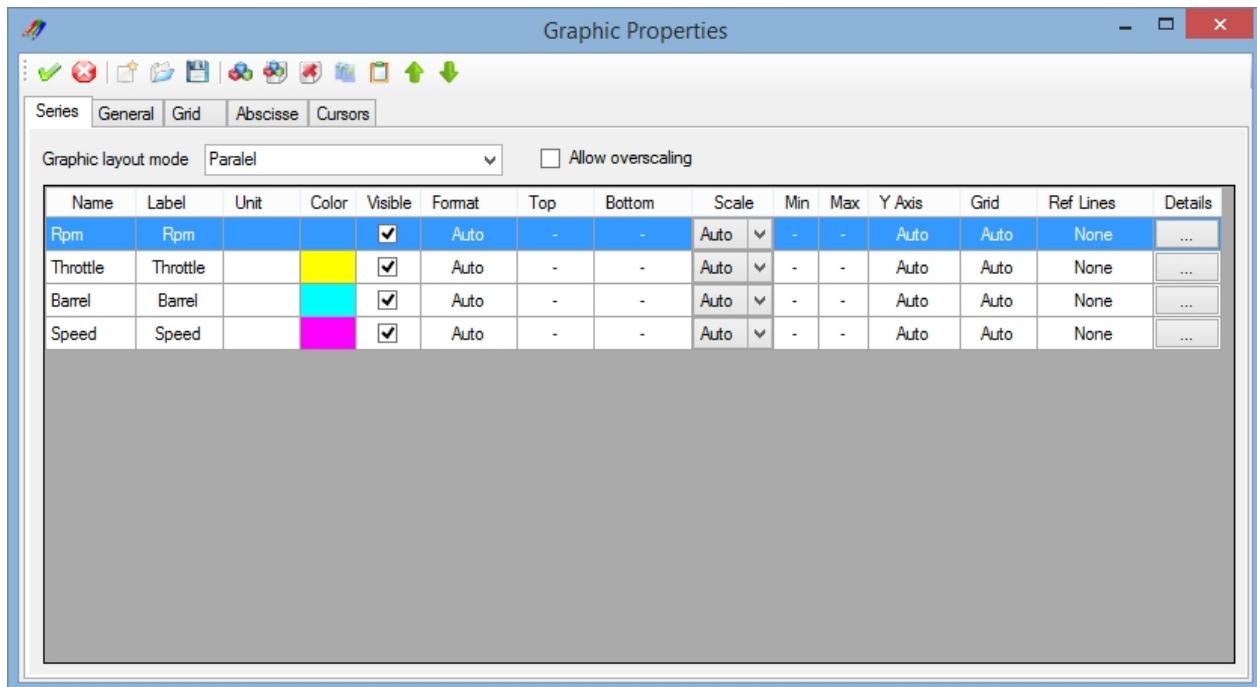


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Graphic window configuration

The graphic configuration window permits to edit all properties related to the the graphic window.

Click the 'Edit graph properties'  button of the tool bar to open the graphic configuration window. This command is also available through the 'Properties'  item of the graphic contextual menu. Alternatively, press the 'G' key of the keyboard to open the configuration window.



The graphic configuration window is composed by a tool bar and a multi-tabs window.

Each tab of the multi-tab is dedicated to a particular configuration section. There five different sections:

- Series: Generic properties of the graph series (or trace)
- General: General properties of the graphic window
- Grid: Graphic window grids properties
- Abscisse: Properties related to the graphic abscisse (X axis)
- Cursors: Graphic properties of [main](#) and [reference](#) cursors

Tool bar contains most common configuration commands.

 **Apply:** Apply graphic configuration changes

 **Cancel:** Cancel graphic configuration changes

 **New:** Create a new graphic configuration file

 **Open:** Open a graphic configuration file (*.xgw)

 **Save:** Save the graphic configuration file (*.xgw)

Check the '[Generic series properties](#)' section for details of the rest of tool bar commands

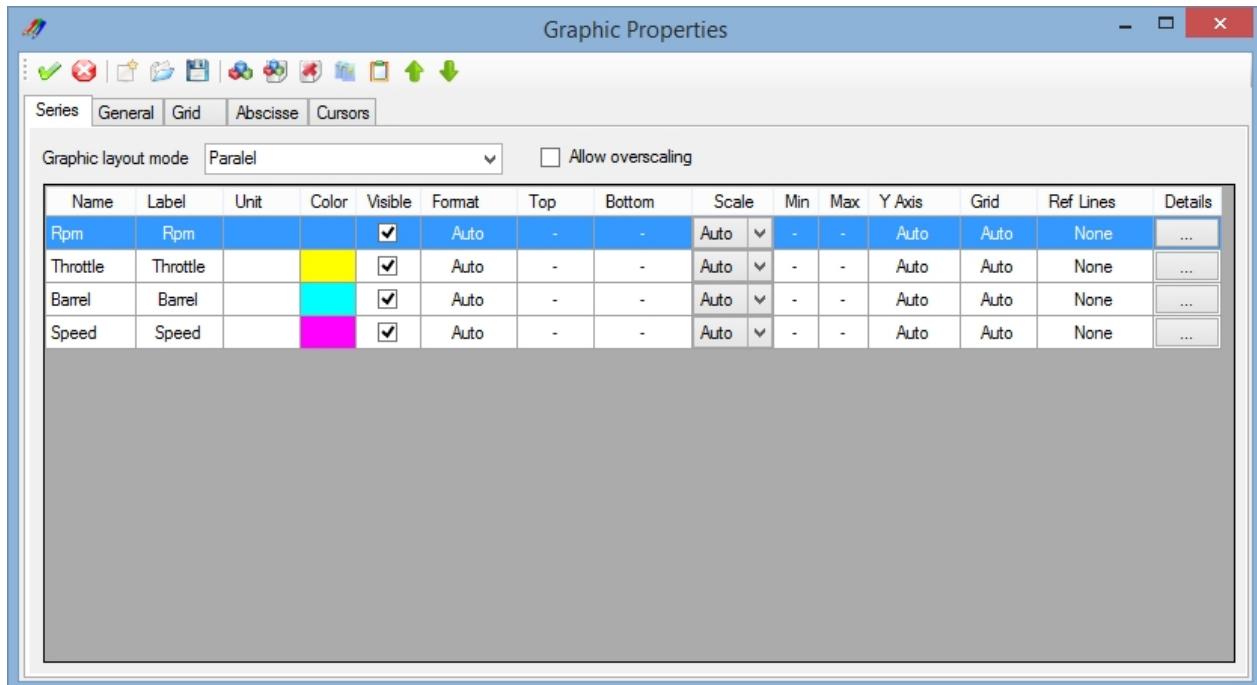
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Generic series properties

The 'Series' tab of the graphic configuration window contains generic properties of graphic series (or trace)

List graphic layout mode permits to change the current [layout mode](#) of the graphic.

All graphic series (or traces) are shown in the series grid.



First cell apart, all cells value can be modified in order to set a particular property of a graphic serie.

- Name: Name of data channel as shown in the channel list used as data source of the serie.
- Label: Title of the serie in the graphic legend.
- Unit: Serie value unit shown in the graphic legend.
- Color: Trace color of the serie in the graphic and in the legend.
- Visible: Serie visible flag. Check the box to make the serie visible, uncheck it to hide the serie.
- Format: Double click on this cell to open the serie value format dialog.
- Top: Serie top position in the graphic area. This setting is only available with the 'Custom' layout mode.
- Bottom: Serie bottom position in the graphic area. This setting is only available with the 'Custom' layout mode.
- Scale: Serie scaling mode, either 'Auto' or 'Manual'. See 'General serie properties' section for more details.
- Y Axis: Double click on this cell to open the serie Y axis properties setting dialog.
- Grid: Double click on this cell to open the serie custom grid properties setting dialog.
- Ref lines: Double click on this cell to open the serie reference lines properties setting dialog.
- Details: Click on this cell to open the whole detailed serie properties dialog.

Some commands of tool bar are specific to the 'Series' tab

 **Channel list:** Open the channel list to add graphic series

 **Create serie:** Create new graphic serie

 **Delete serie:** Delete a graphic serie

 **Copy:** Copy a graph serie

 **Past:** Past a graph serie

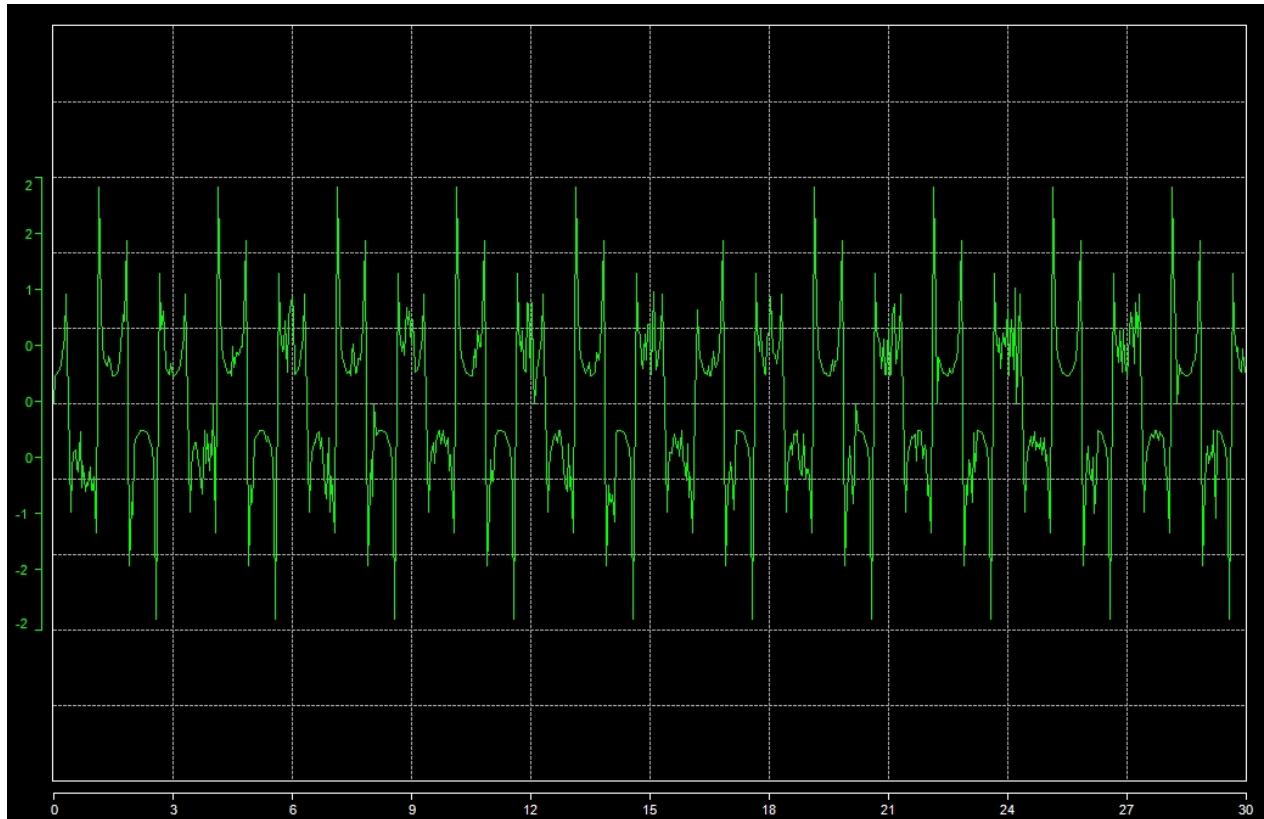
 **Move up:** Move a serie up in the grid

 **Move down:** Move a serie down in the grid

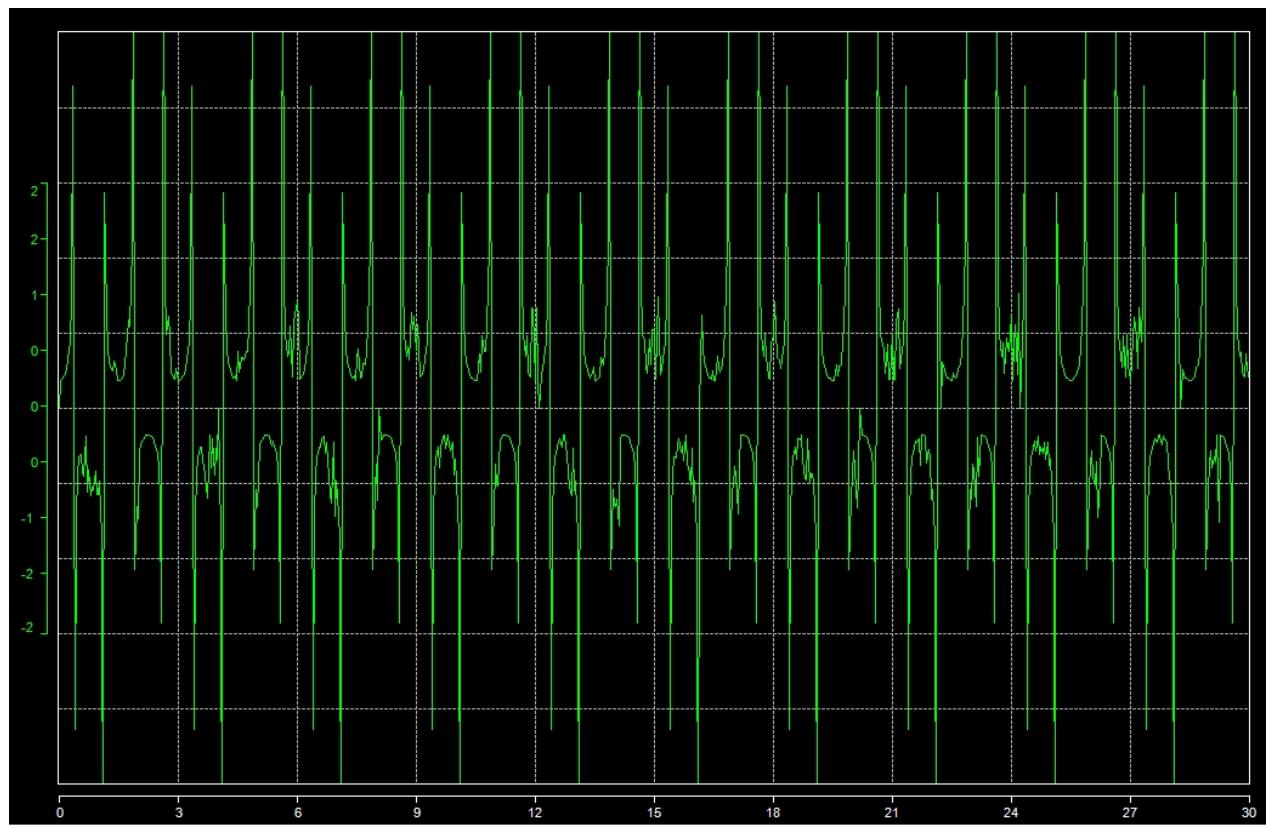
Check box 'Allow overscaling' enable over scaling for all graphic series.

Over scaling is applied on series only for the 'Manual' serie scaling mode. If the scale span set by the user is smaller than the actual serie values span, the 'Overscaling' flag will defined whether or not, out of scale sample should be drawn on the graphic.

Non over scaled graphic:



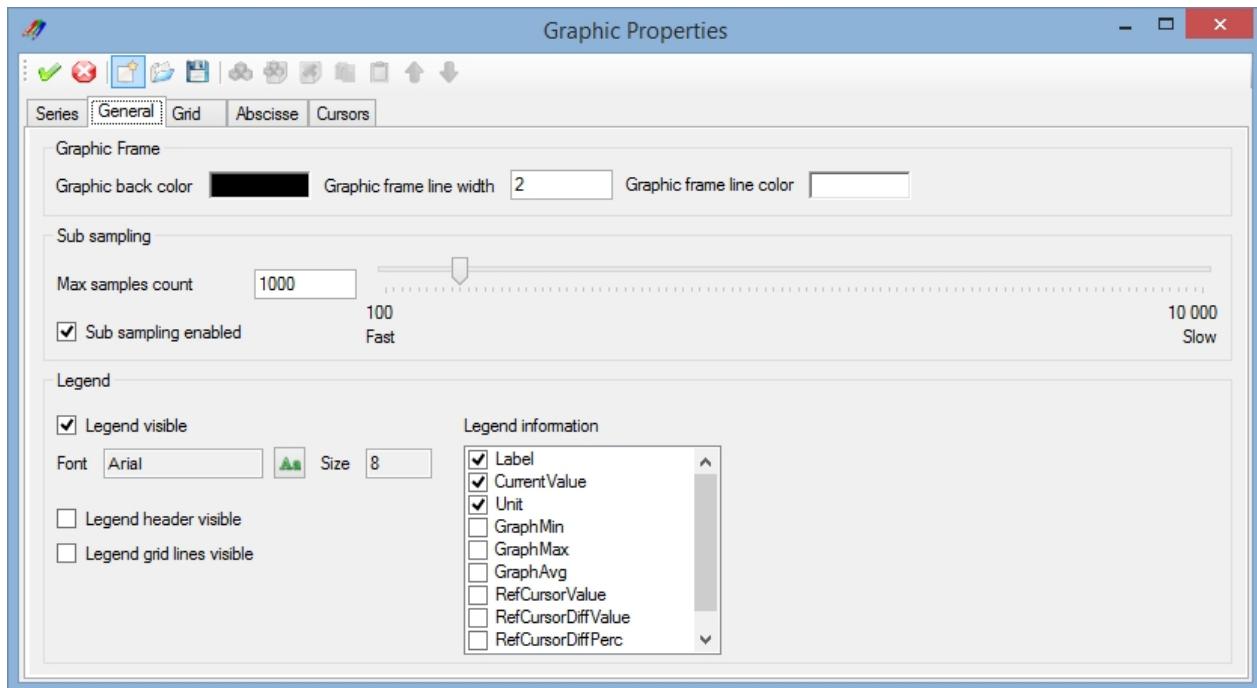
Over scaled graphic:



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General properties

The 'General' tab contains general graph window properties



Graphic frame

This panel contains properties of the graphic frame

- Window back color: Double click on the colored square to open the color selection dialog and define the graph window back color.
- Graphic frame line width: Set the desired width of the graphic frame lines
- Graphic frame line color: Double click on the colored square to open the color selection dialog and define the graphic frame lines color.

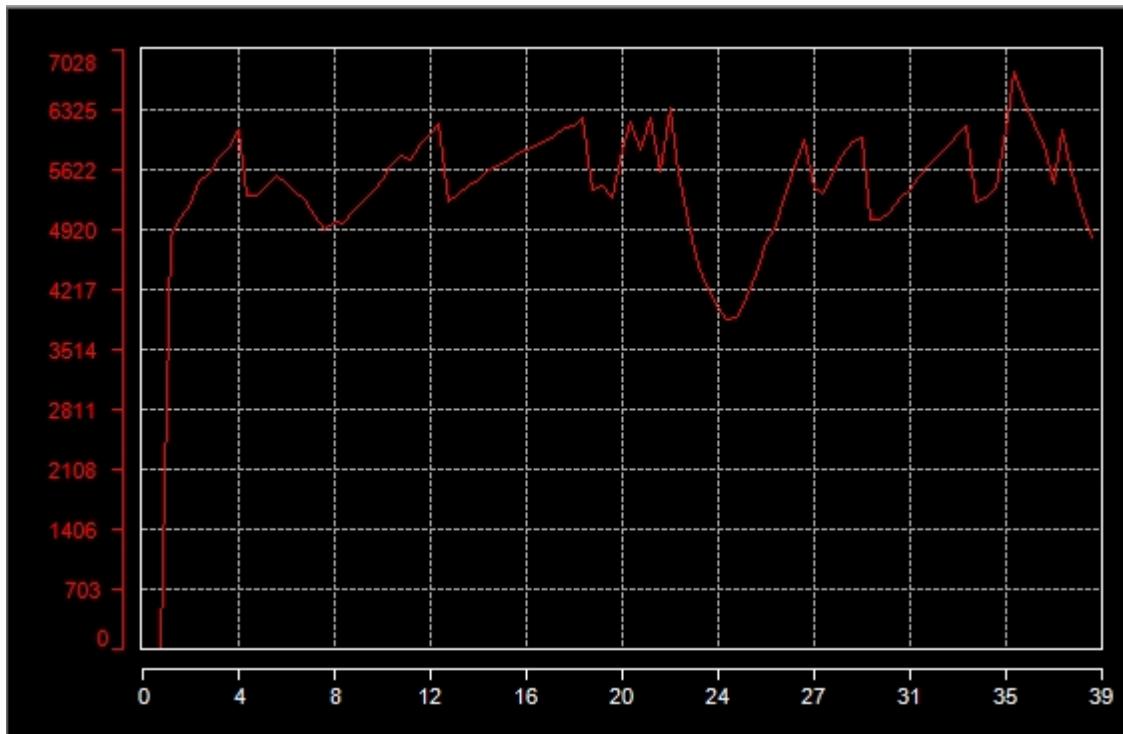
Sub sampling

Sub sampling property defines the maximum number of samples that will drawn in the graphic for each serie.

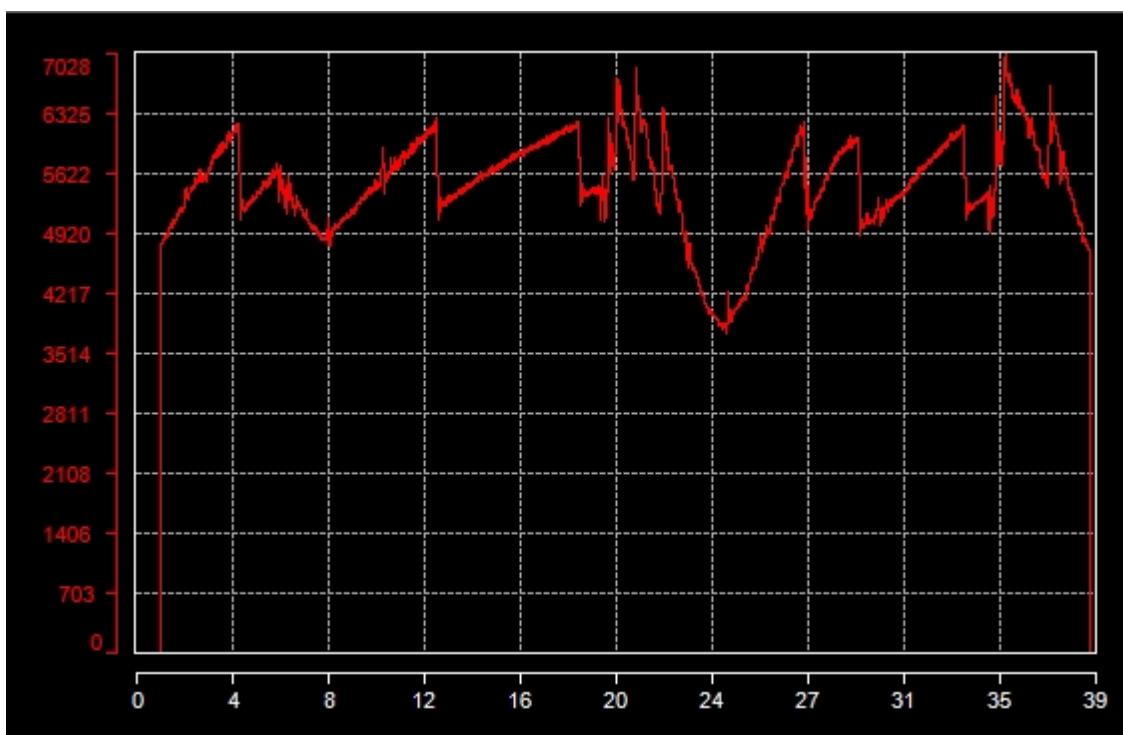
In order to accelerate graphic drawing, number of samples drawn can be limited to a certain value that keeps drawing time within a reasonable limit without altering the graphic accuracy. Bigger is the drawn samples count longer will be the graphic drawing.

Tick the 'Sub sampling enabled' box to enable the sub sampling and move the sub sampling cursor or type a value into the 'Max samples count' text box to define the sub sampling level.

Sub sampling set to 100 (100 samples drawn)



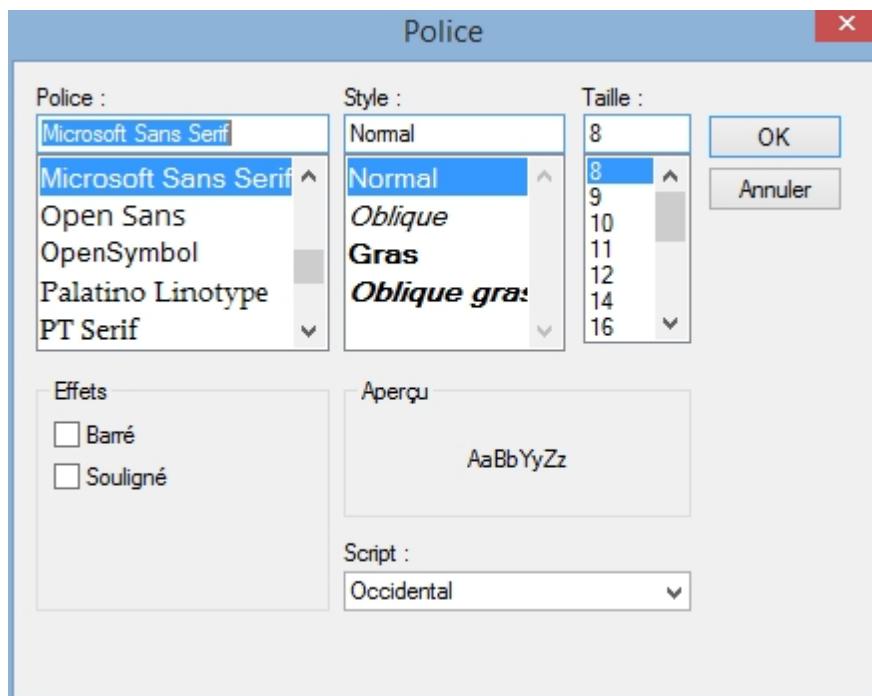
Sub sampling disabled (26 000 samples drawn)



Legend

In addition of [legend](#) properties that can be directly set in the graphic window (infos and header/grid lines visible), it is here possible to change the font used for legend items.

Click the 'Font'  button to open the font selection dialog, select a font and set its size and attributes and click 'OK'



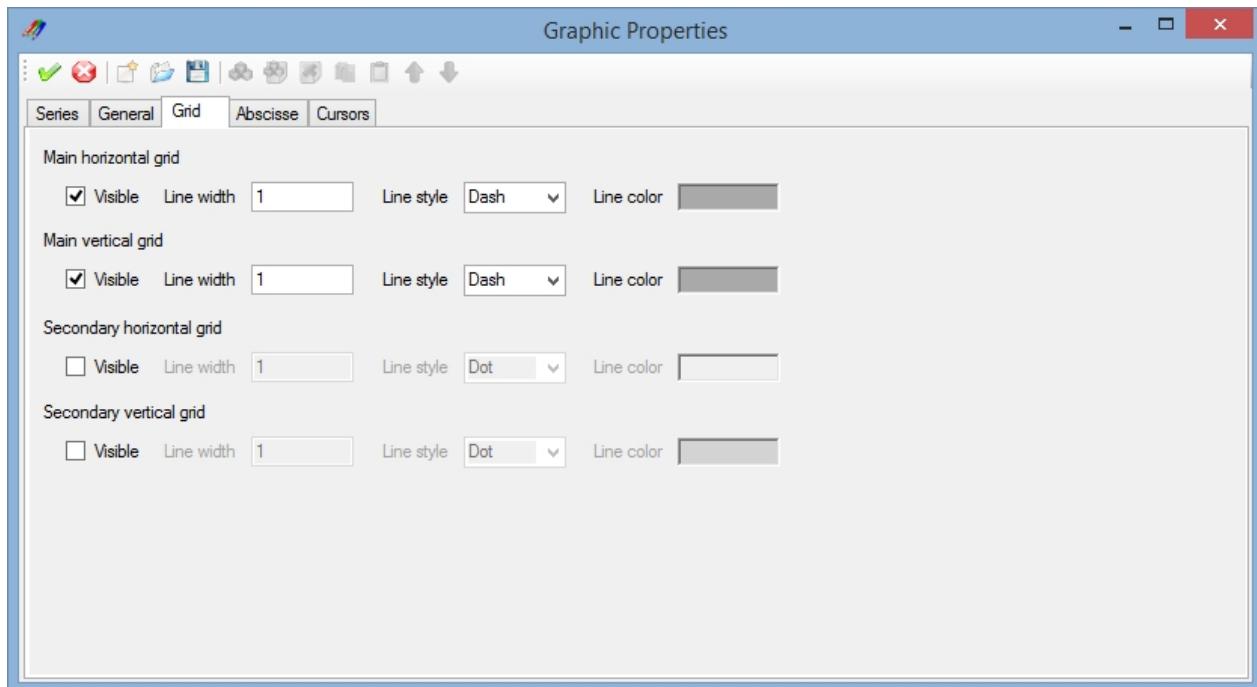
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Graphic grids properties

In order to enhance the analysis experience, vertical and horizontal grids are drawn in background of the graphic area.

There are two kinds of grid:

- Main grid: Main grid (horizontal and vertical) chops the graphic area in ten parts
- Secondary grid: Secondary grid (horizontal and vertical) chops the graphic area in twenty parts

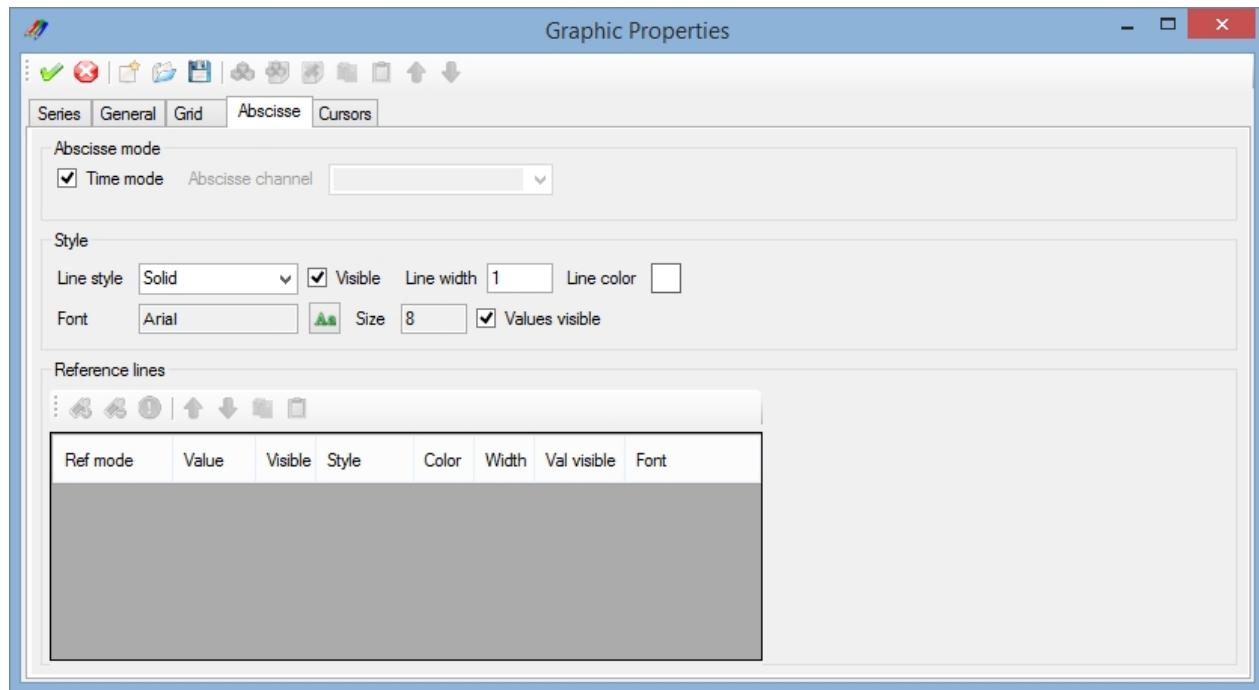


Each single grid (main/secondary, horizontal/vertical) can be individually set.

- Visible: Check the 'Visible' box to make the grid visible.
- Line width: Set the width of the grid line.
- Line style: Set the line style of the grid line. Check '[Line styles](#)' section for details.
- Line color: Double click the colored area to open the color selection dialog and select the grid line color.

Abscisse properties

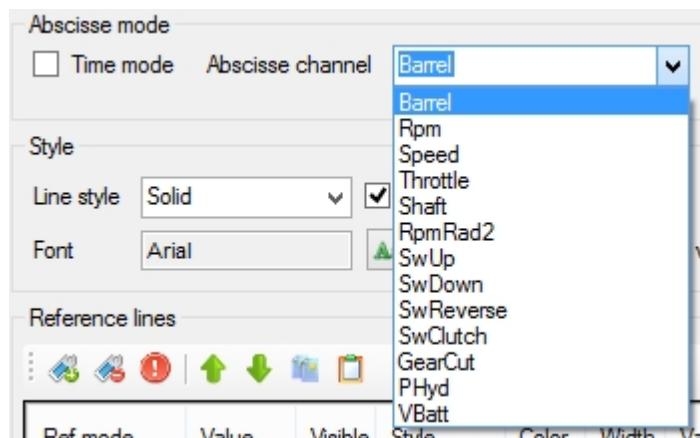
The 'Abscisse' tab contains graph window abscisse (X axis) properties



Abscisse mode

By default graphic uses the first channel of the data file (the time basically) as values for the Xaxis. It is however possible to choose another data channel as data source for the Xaxis.

Uncheck the 'Time mode' box and pick a channel up in the 'Abscisse channel' list to use it as Xaxis data source.

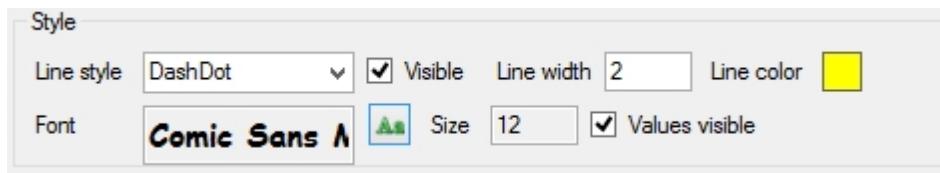


Style

This panels regroup Xaxis aspect properties

- Line style: Select the X axis line style. Check '[Line styles](#)' section for details.
- Visible: Check/uncheck this box to make the X axis visible or invisible.
- Line width: Set the width of the X axis line.
- Line color: Double click the colored square to open the color selection dialog and select the X axis line color.
- Font: Click the 'Font'  button to open the font selection dialog, select a font and set its size and attributes and click 'OK'
- Values visible: Check/uncheck this box to make the X axis values visible or invisible

Example of a customized X axis

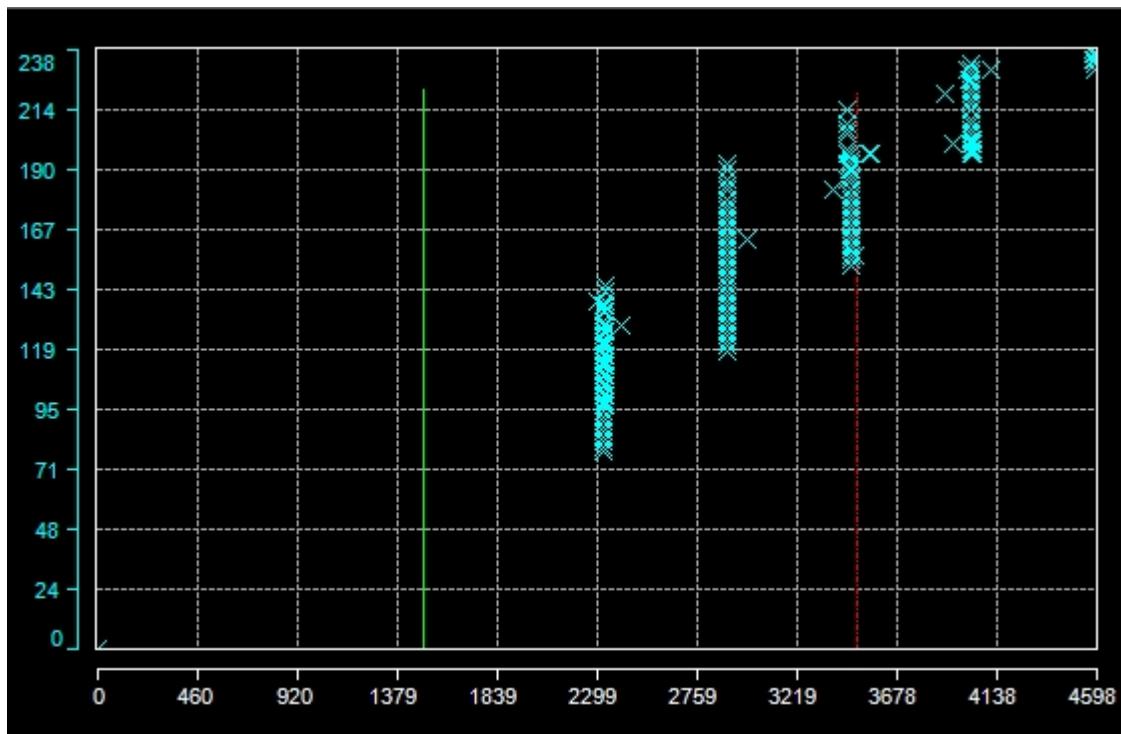


Reference lines

Abscisse reference lines are available only if the abscisse [time mode](#) is disabled.

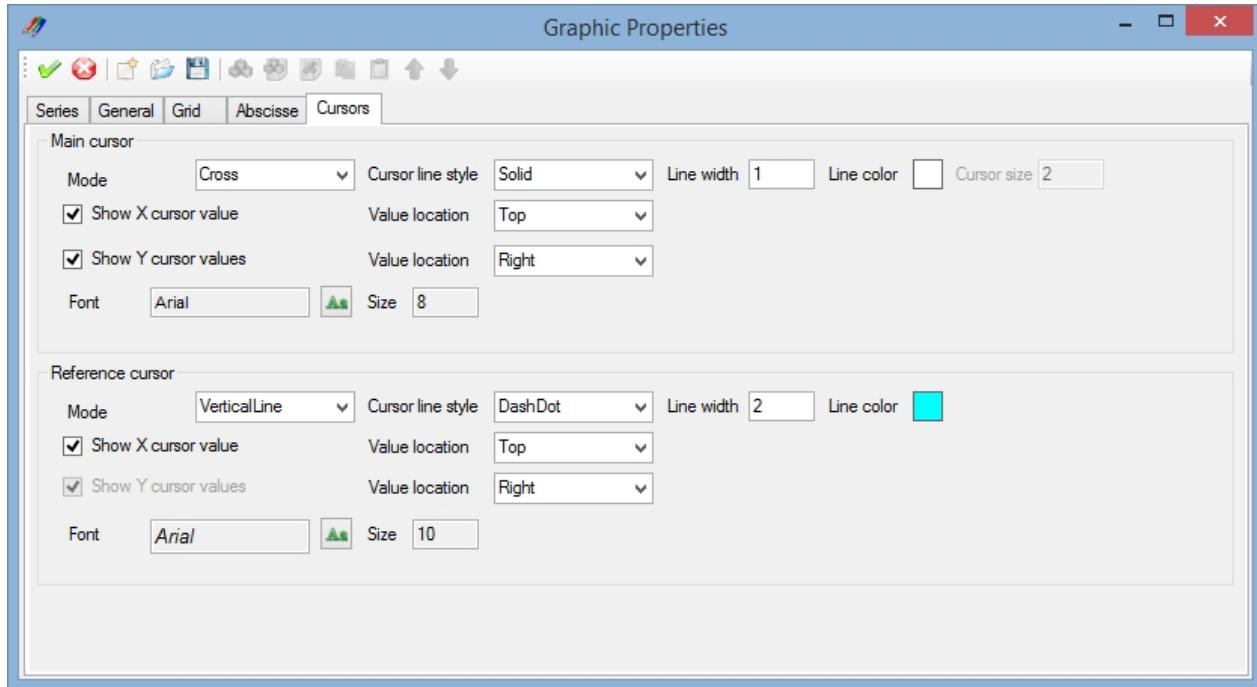
Manage X axis reference lines from this panel. Check '[Serie reference lines](#)' section for more details

Example of graphic using abscisse reference line



Cursors properties

The 'Abscisse' tab contains graph window abscisse (X axis) properties



Main cursor

In addition of main cursor properties that can be directly set in the graphic window, it is here possible to change the graphical aspect of the main cursor.

- Mode: Select in this list the [main cursor mode](#)
- Line style: Select the cursor line style. Check '[Line styles](#)' section for details.
- Line width: Set the width of the cursor line.
- Line color: Double click the colored square to open the color selection dialog and select the cursor line color.
- Show X value: Check/uncheck this box to make the [cursor X value](#) visible or invisible.
- Show Y values: Check/uncheck this box to make the [cursor Y values](#) visible or invisible.
- Xcursor value location: Set the location (left, right or center) of the [cursor X value](#).
- Y cursor values location: Set the location (top, bottom or center) of the [cursor X values](#).
- Font: Click the 'Font'  button to open the font selection dialog, select a font and set its size and attributes and click 'OK'

Reference cursor

In addition of reference cursor properties that can be directly set in the graphic window, it is here possible to change the graphical aspect of the reference cursor.

- Mode: Select in this list the [main cursor mode](#)
- Line style: Select the cursor line style. Check '[Line styles](#)' section for details.
- Line width: Set the width of the cursor line.

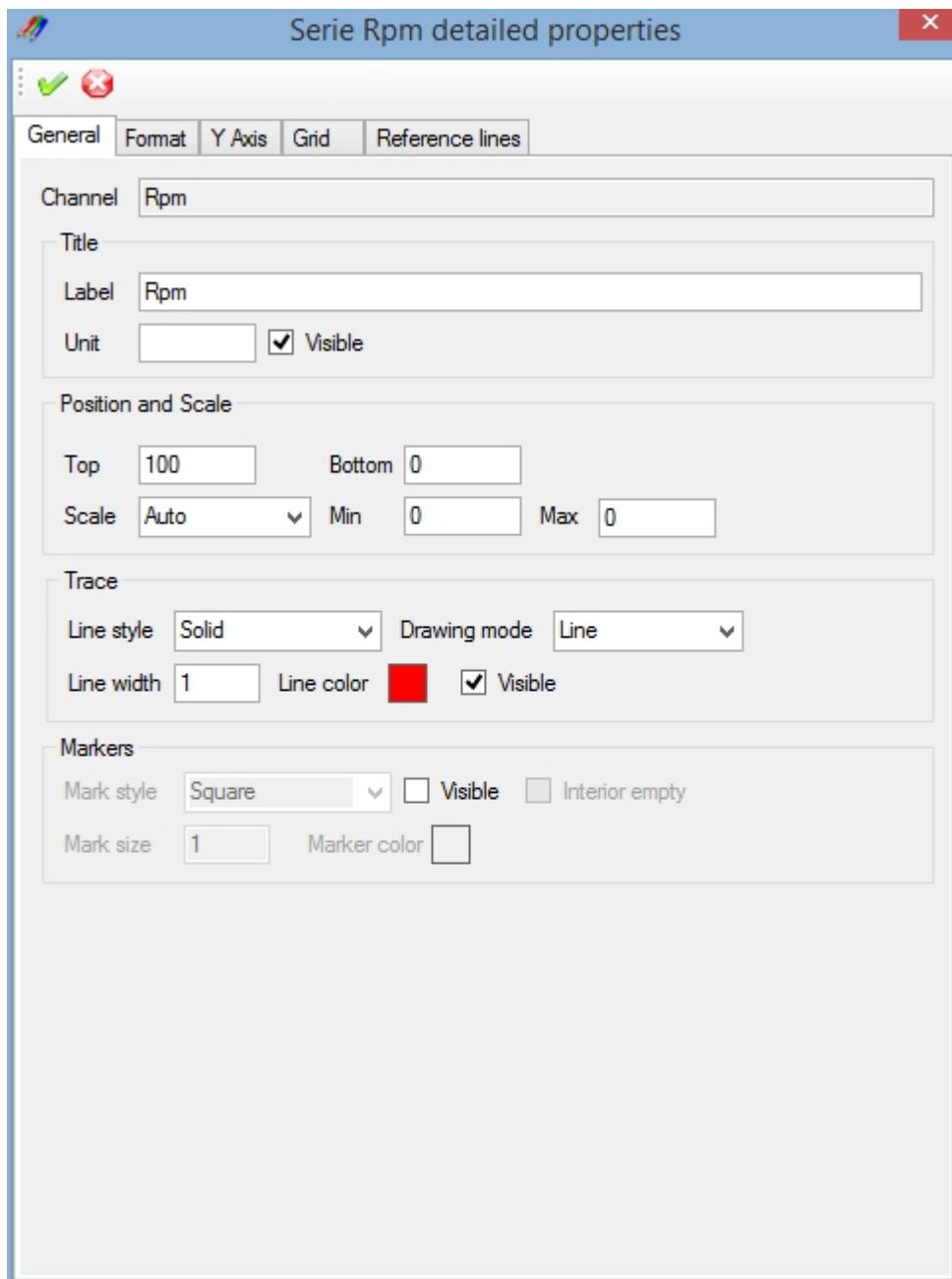
- Line color: Double click the colored square to open the color selection dialog and select the cursor line color.
- Cursor size: Only available for 'Graticule', 'Square' and 'Circle' modes, set the size of the cursor.
- Show X value: Check/uncheck this box to make the [cursor X value](#) visible or invisible.
- Show Y values: Check/uncheck this box to make the [cursor Y values](#) visible or invisible.
- X cursor value location: Set the location (left, right or center) of the [cursor X value](#)
- Y cursor values location: Set the location (top, bottom or center) of the [cursor X values](#)
- Font: Click the 'Font'  button to open the font selection dialog, select a font and set its size and attributes and click 'OK'

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Graphic serie detailed configuration window

The graphic serie detailed configuration window permits to edit all properties related to a graphic serie.

To open this form, double click on a serie in the [legend](#), or open the '[Graphic window configuration](#)' form and click the 'Details' button of a serie in the '[Series](#)' configuration tab.



The graphic configuration window is composed by a tool bar and a multi-tabs window.

Each tab of the multi-tab is dedicated to a particular configuration section. There five different sections:

- General: [General properties](#) of the graphic serie
- Format: Serie value [format](#) properties

- Y Axis: Serie [Y_axis](#) properties
- Grid : Serie [custom grid](#) properties
- Reference lines: Serie [reference lines](#) properties

Tool bar contains most common configuration commands.

 **Apply:** Apply graphic configuration changes

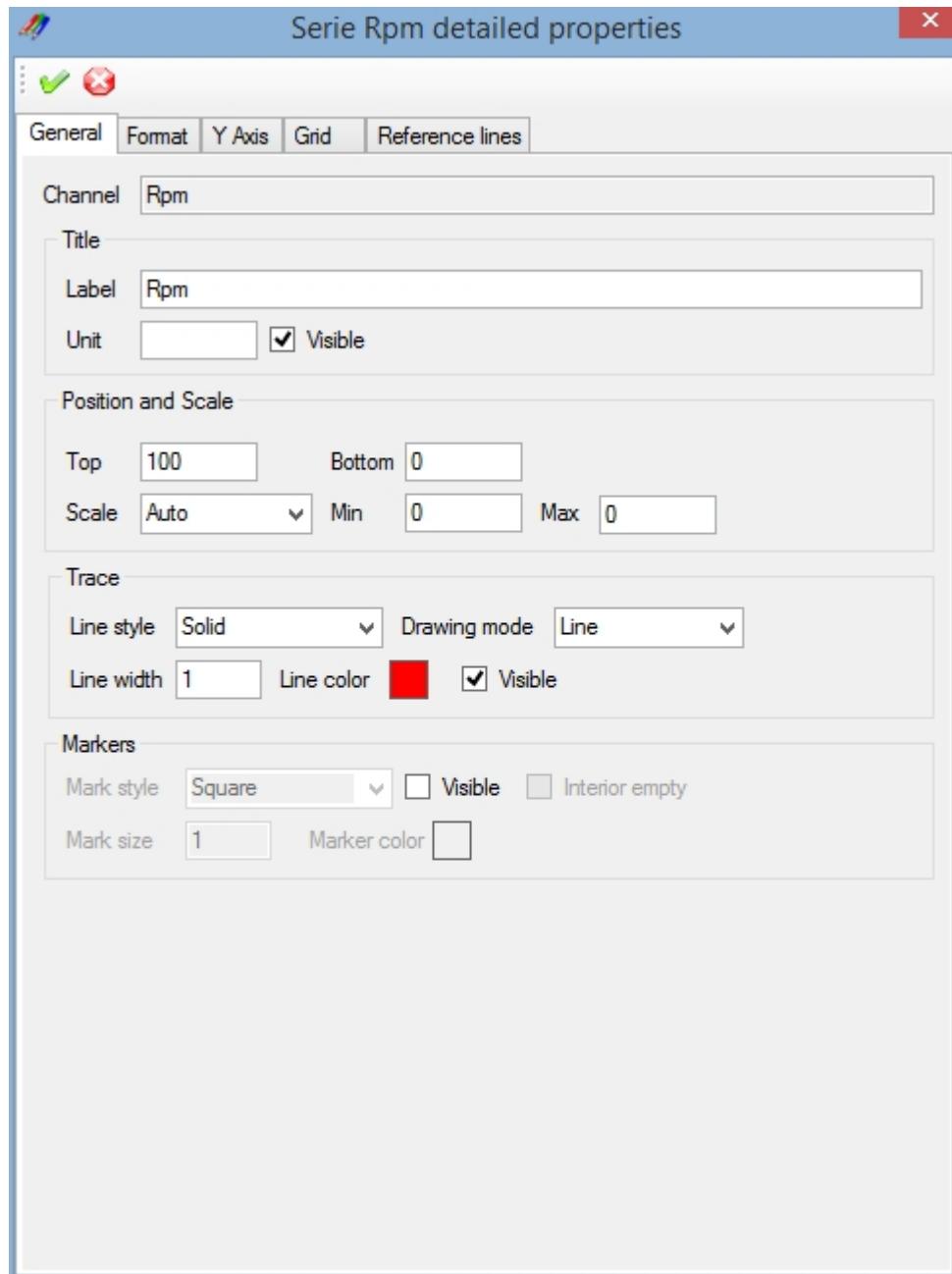
 **Cancel:** Cancel graphic configuration changes

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Serie general properties

As per the 'Generic series properties' panel of the 'Graphic window configuration' form, this regroups main serie properties, but not only.

Graphical trace aspect can be fully customized from this panel.



Channel

Content of this text box cannot be modified, it only shows the data channel source of the serie.

Title

This panel contains legend properties of the serie.

- Label: Title of the serie shown in the legend. Label can be different than the name of the data channel
- Unit: Serie value unit
- Visible: Master visibility switch, whatever 'Trace' and 'Marker' visibility states are if that box is not checked, serie will not be drawn in the graphic.

Position and scale

Set the serie position and scale properties

- Top: Serie's top position in the graphic area
- Bottom: Serie's bottom position in the graphic area
- Scale mode: Scaling mode of the serie, either 'Auto' or 'Custom'
- Min: Custom scale minimum value
- Max: Custom scale maximum value

It is important to note that 'Top' and 'Bottom' properties are applied only if the graphic layout is set to 'Custom'.

Regarding scaling mode, in 'Auto' mode, actual serie's minimum and maximum values are used to set the scale.

Trace

Set the serie trace aspect.

- Line style: Select the trace line style. Check '[Line styles](#)' section for details.
- Drawing mode: Serie's trace drawing mode, either 'Line' or 'Step'.
- Line width: Set the width of the trace line.
- Line color: Double click the colored square to open the color selection dialog and select the trace line color.
- Visible: Trace visibility flag. Check that box to make the trace visible

As far as the drawing mode, 'Line' means that two graphic samples will be joined by a simple line and 'Step' means that two sample will be joined with two lines in a shape of a step.

It is important to note, that assuming the the master visible switch of the title panel is set. If both 'Visible' checks of 'Trace' and 'Markers' are set, serie will be shown with trace and markers. If none of those are set, serie will not be drawn whatever value has the master visible switch.

Markers

Set the serie trace aspect.

Markers are special shapes placed on each graphical sample marking the real position of a sample in the graph.

There are 5 possible shapes for makers



Square

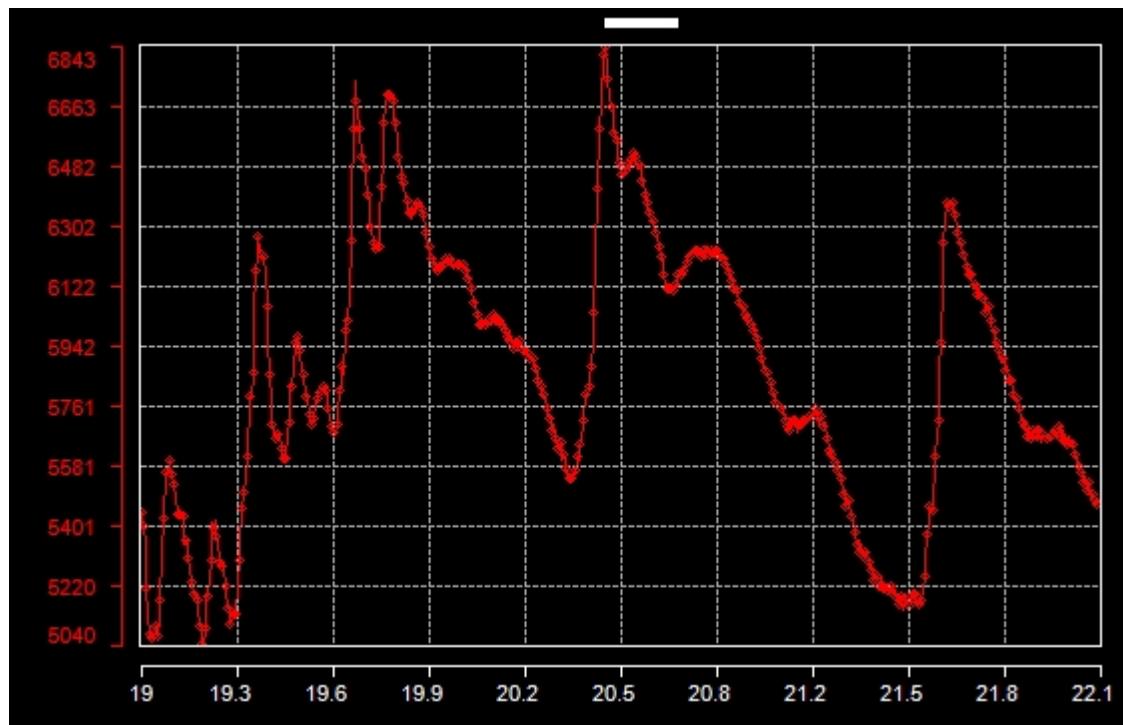


Markers have the following properties

- Mark style: Select the marker style. ('Square', 'Round', 'Diamond', 'Cross' or 'Triangle')
- Visible: Markers visibility flag. Check that box to make markers visible
- Interior empty: Set markers emptiness. If this box is not checked, markers will be filled with the marker color
- Mark size: Set the size of the marker
- Marker color: Double click the colored square to open the color selection dialog and select the mark color.

It is important to note, that assuming the the master visible switch of the title panel is set. If both 'Visible' checks of 'Trace' and 'Markers' are set, serie will be shown with trace and markers. If none of those are set, serie will not be drawn whatever value has the master visible switch.

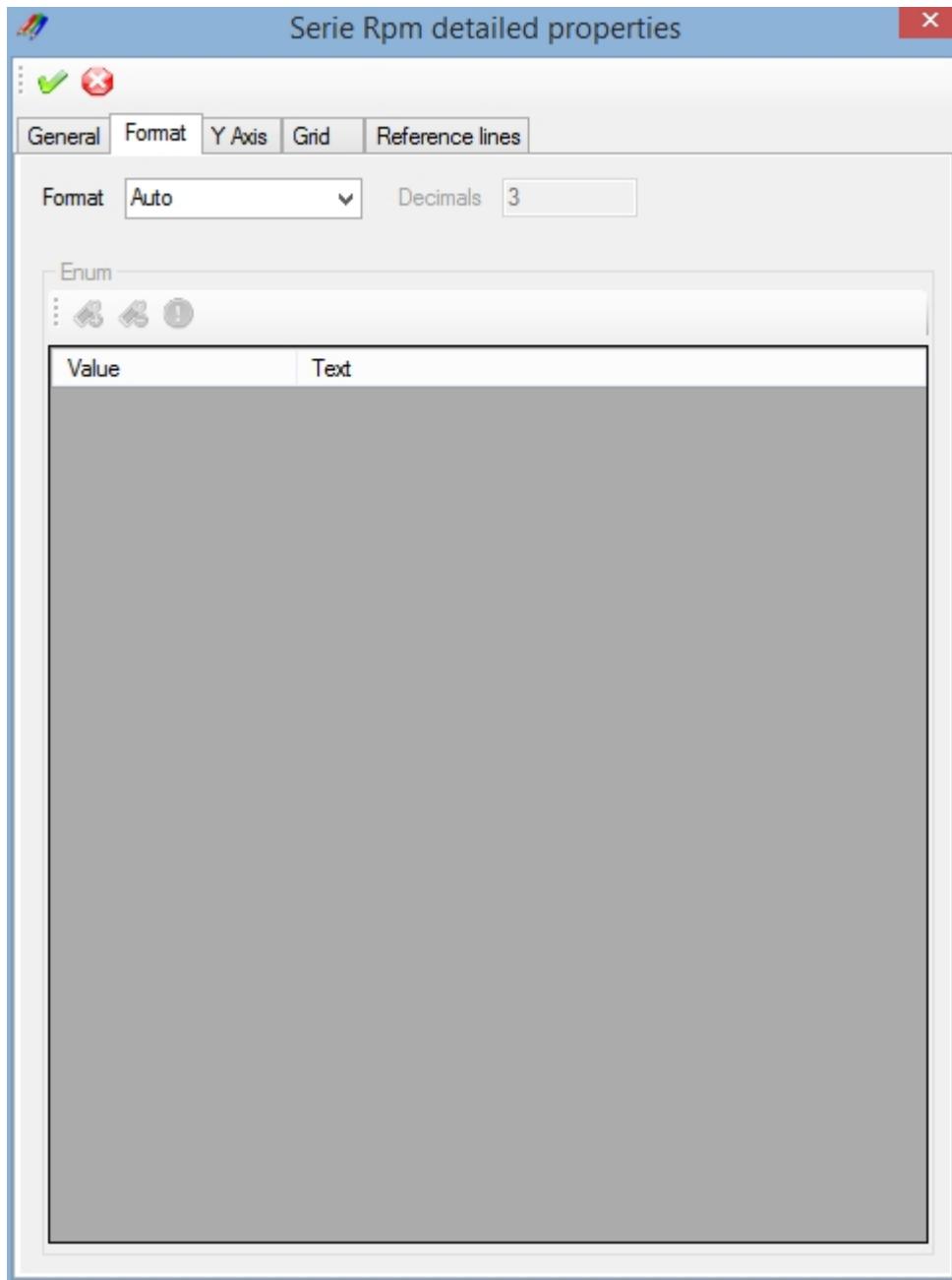
Example of graphic set with trace and markers



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Serie format

The 'Format' tab contains serie value format properties



The serie's format describes how physical values of the serie are formated.

For example, if a the value of a serie is 21.47895526 in the data file, using the format property this value can be shown in the graphic as 21.5 or 21.48.

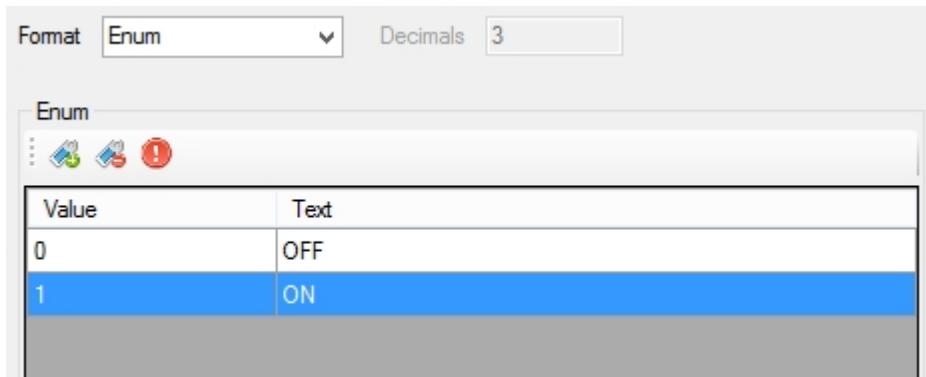
Five formats are available:

- Auto: Value is shown as a decimal value and number of decimal digits is a function of the span of plotted samples
- Decimal: Value is shown as a decimal value and number of decimal digits is set by the user

- Hexadecimal: Value is shown as an hexadecimal value, decimal part of the value being skipped.
- Binary: Value is shown as a binary value, decimal part of the value being skipped.
- Enum: A text is set for every possible value and this text is shown in the legend.

Enum format

To configure an enumeration for a serie, first select 'Enum' in the 'Format' list. Once 'Enum' selected, the enumeration configuration grid becomes active.



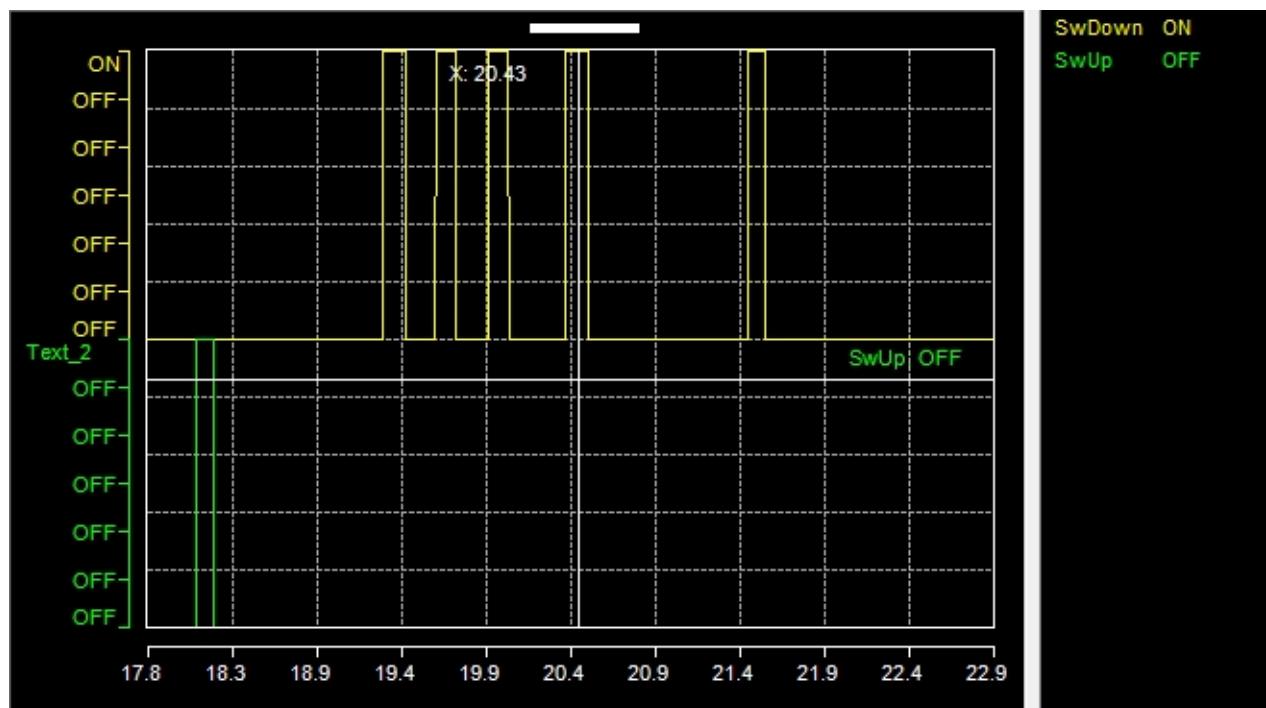
The 'Enum' panel is composed by a tool bar, containing enumeration control commands, and a grid containing every possible values of the serie and their corresponding text.

Click the 'Add enum' button to add a value into the enumeration. Set a value into the 'Value' cell and the corresponding text into the 'Text' cell.

Click the 'Delete enum' button to delete a value from the enumeration.

Click the 'Clear enums' button to remove all values of the enumeration.

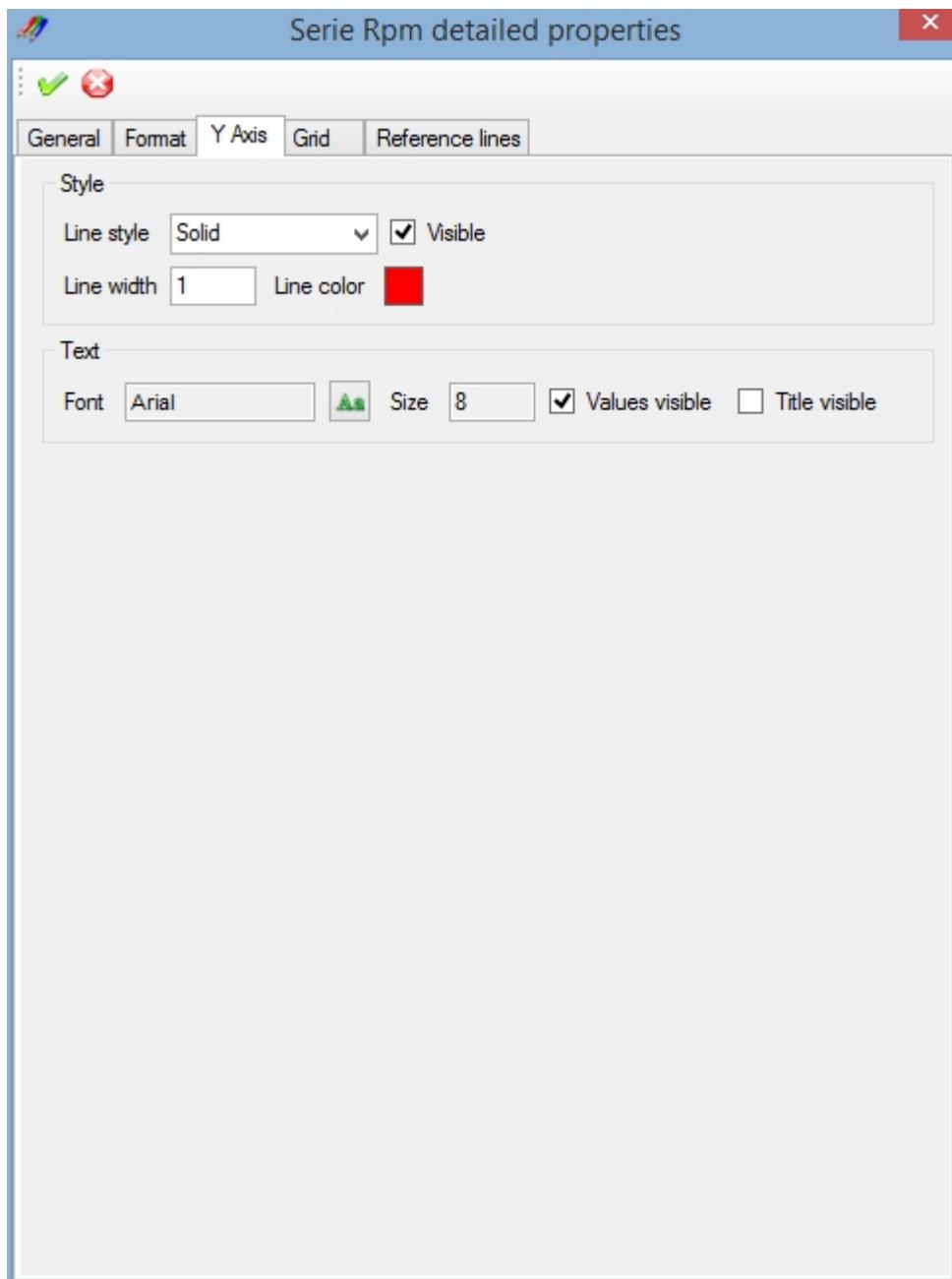
Example of graphic using enum format



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Serie Y Axis

The 'Y Axis' tab contains serie Y axis properties



Style

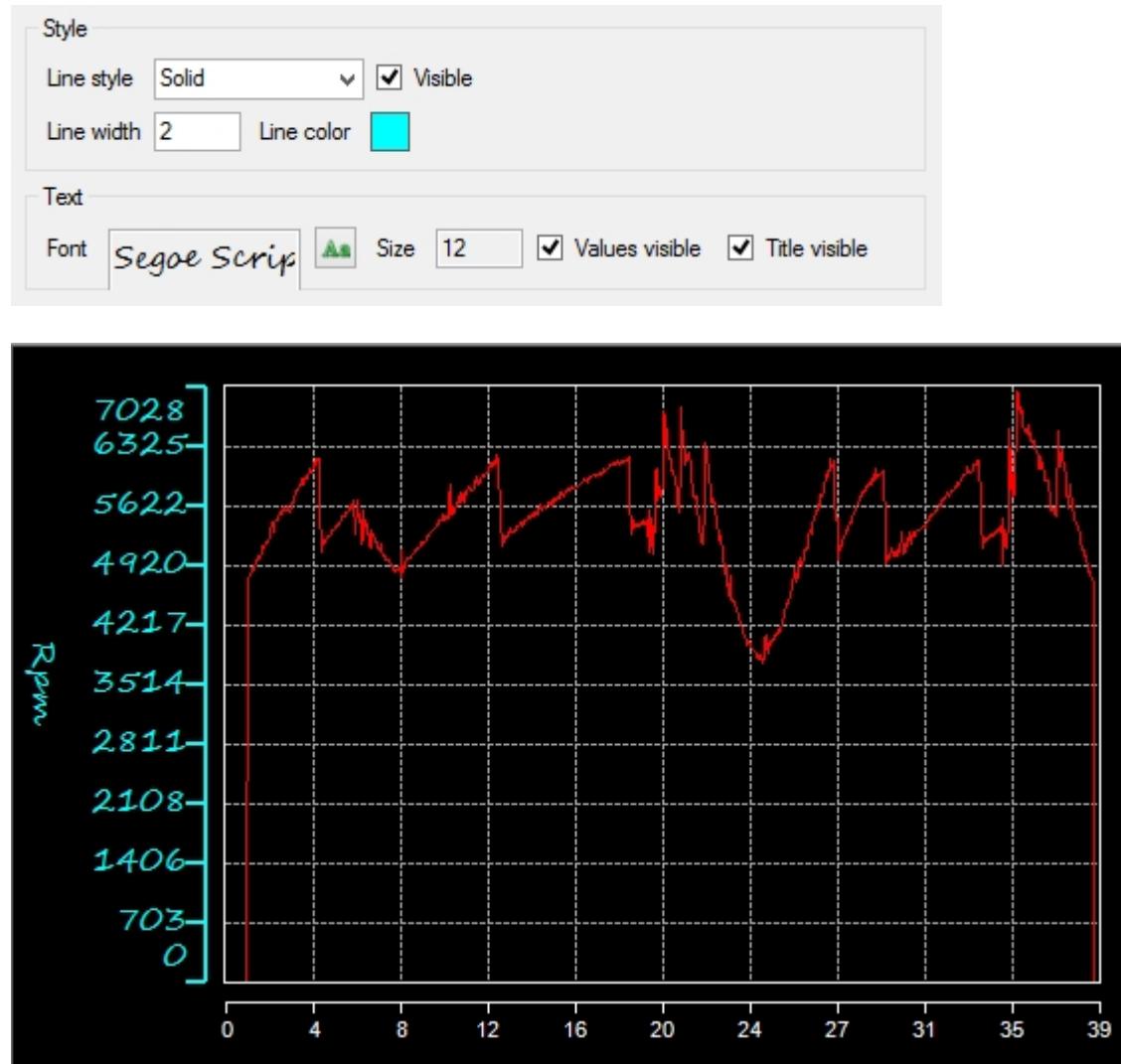
- Line style: Select the Y axis line style. Check '[Line styles](#)' section for details.
- Visible: Y axis visibility flag. Check that box to make the Y axis visible
- Line width: Set the width of the Y axis line.

- Line color: Double click the colored square to open the color selection dialog and select the Y axis line color.

Text

- Font: Click the 'Font'  button to open the font selection dialog, select a font and set its size and attributes and click 'OK'
- Value visible: Y axis values visibility flag. Check that box to make the Y axis values visible
- Title visible: Y axis title visibility flag. Check that box to make the Y axis title visible

Example of a graphic with a customized Y axis

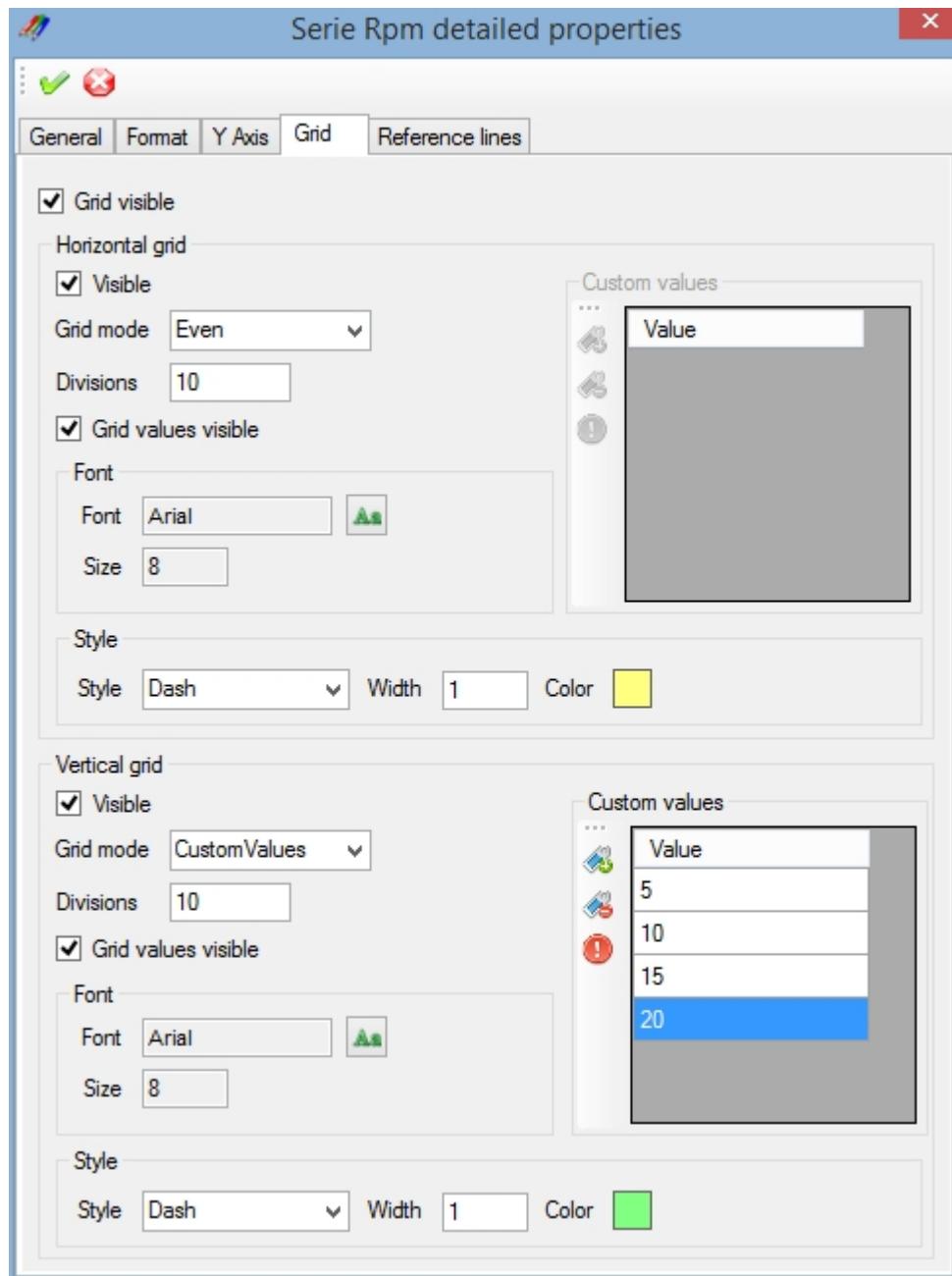


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Serie custom grid

In addition of standard [graphic grids](#), a graphic serie may have its own custom grid. Custom grid can be used as a complement of [serie reference lines](#).

The 'Grid' tab of the 'Graphic serie detailed properties' window permits to set up this custom grid.



The 'Grid' tab is split in two sections: 'Horizontal grid' and 'Vertical grid'. Both sections containing properties for horizontal grid lines and vertical grid lines.

Visible

The 'Grid visible' check box at the top of the tab Grid visible is the master grid visibility switch.

The serie's custom grid will be drawn only if this box is checked. This allows the user to decide whether or not the custom grid should be drawn by a simple command whatever the grid lines settings are.

Grid lines properties

Both 'Horizontal grid' and 'Vertical grid' panels contain the same properties for grid lines.

- Visible: Grid lines visibility flag. Check that box to make horizontal or vertical grid lines visible
- Grid values visible: Grid lines values visibility flag. Check that box to make horizontal or vertical grid lines values visible

Grid mode

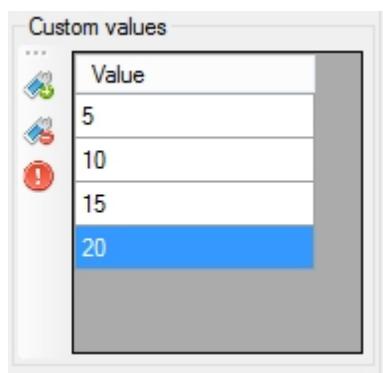
A serie custom grid may be drawn in different fashions:

- None: No grid lines (equivalent to uncheck the 'Grid visible' box)
- Even: Grid lines will be evenly set along graphic area of the serie
- MinMaxAvg: Three grid lines will be drawn at minimum, maximum and average values of the serie
- MinMaxZero: Three grid lines will be drawn at minimum, maximum and zero values of the serie
- CustomValues: Grid lines will be set at values defined by the user

For the 'Even' mode, number of grid divisions is defined by the 'Divisions' field. It is the actual number of divisions made by the grid, number of grid lines being the number of division +1.

Custom values

The 'Custom values' panel is used when grid mode is set to 'CustomValues'. This panel is composed by a grid containing the user values list and a tool bar regrouping list control commands.



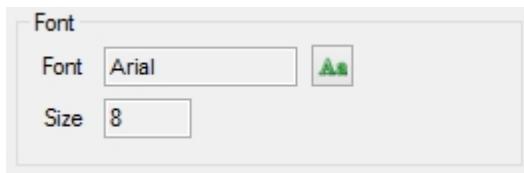
Click the 'Add value' button to add a value into the list. Set a value into the 'Value' cell.

Click the 'Delete value' button to delete a value from the enumeration.

Click the 'Clear values' button to remove all values of the enumeration.

Font

The 'Font' panel defines font properties for grid lines values if the box 'Grid values visible' has been checked.



Click the 'Font' **Aa** button to open the font selection dialog, select a font and set its size and attributes and click 'OK'

Style

The 'Style' panel defines graphical properties of grid lines.



- Style: Select grid lines style. Check ['Line styles'](#) section for details.
- Width: Set the width of grid lines.
- Color: Double click the colored square to open the color selection dialog and select grid lines color.

Example of a graphic using a serie custom grid:



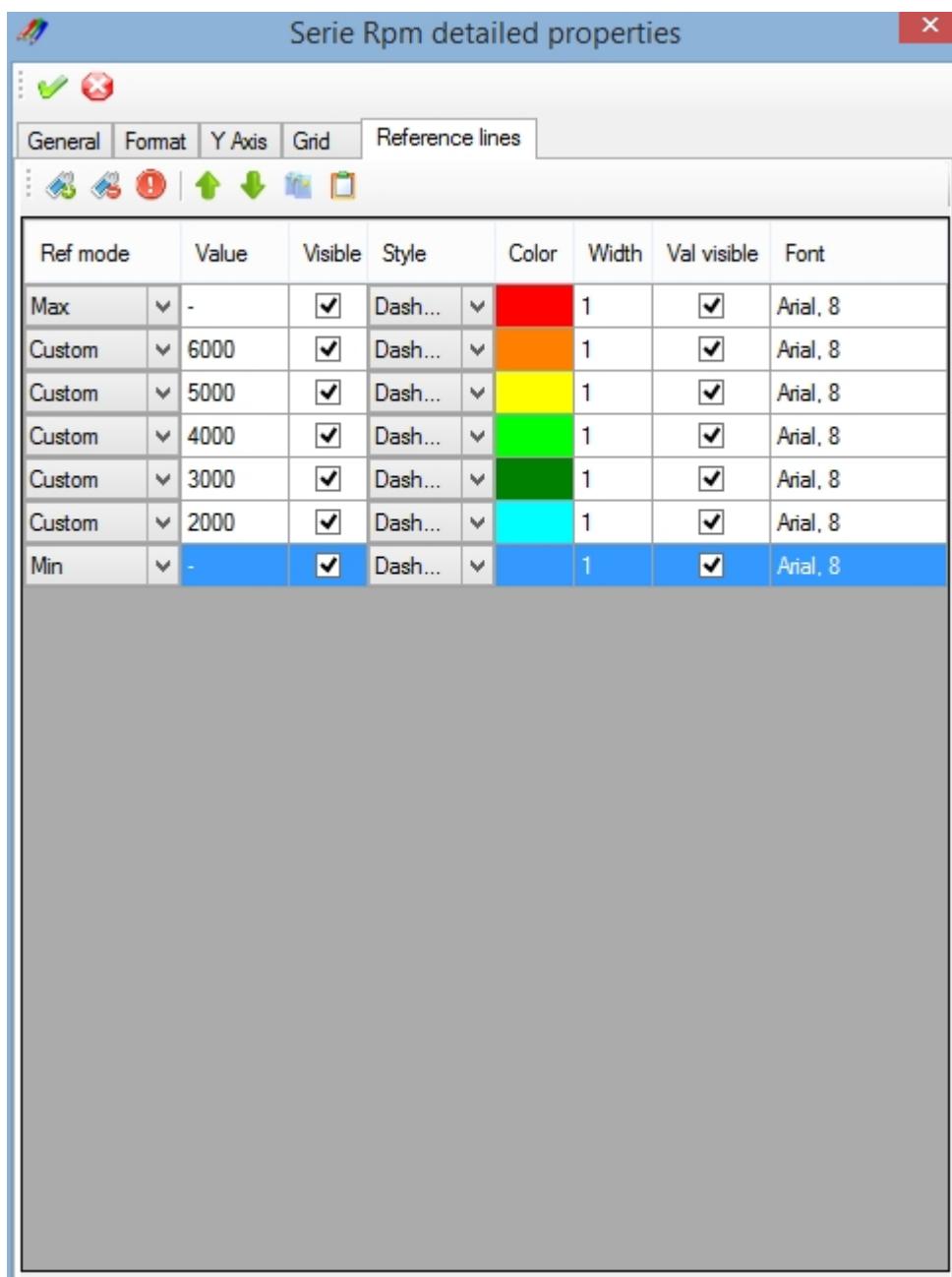
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Serie reference lines

A reference line is a line drawn at a particular value of a graphic serie. A single serie can have multiple reference lines and reference lines can be used as a complement of the [serie custom grid](#).

Reference lines are usually horizontal except in the case of [abscisse](#) reference line where they are vertical.

The 'Reference lines' tab of the 'Graphic serie detailed properties' window permits to set up those reference lines.



The 'Reference lines' tab is composed by a tool bar, containing reference lines control commands, and by grid showing properties of reference lines created by the user.

Tool bar

 **Add:** Create a new reference line

 **Delete:** Delete reference lines selected

 **Clear:** Delete all reference lines

 **Move up:** Move a reference line up in the list

 **Move down:** Move a reference line down in the list

 **Copy:** Copy a reference line

 **Past:** Past a reference line in the list

Reference lines grid

The reference lines grid has different columns for the different properties of a reference line.

Ref mode	Value	Visible	Style	Color	Width	Val visible	Font
----------	-------	---------	-------	-------	-------	-------------	------

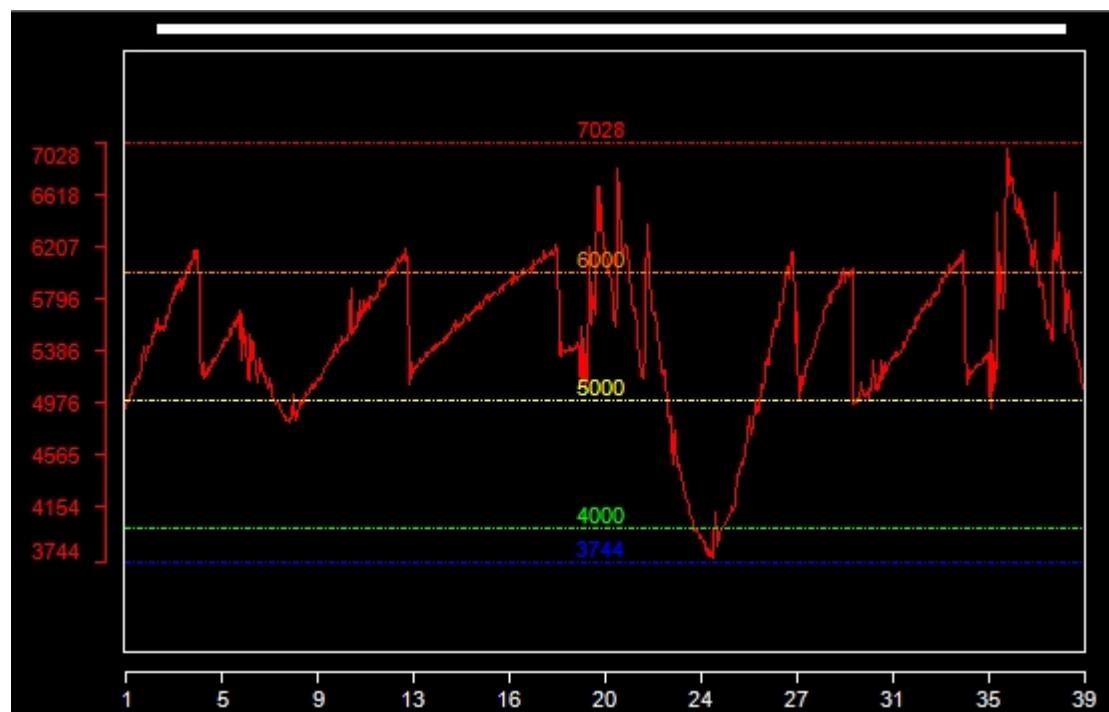
- Ref mode: Reference mode of the reference line
- Value: Value of the reference line in 'Custom' mode
- Visible: Reference line visibility flag. Check that box to make the reference line visible
- Style: Select reference line style. Check '[Line styles](#)' section for details.
- Color: Double click the colored cell to open the color selection dialog and select reference line color.
- Width: Set the width of the reference line.
- Val visible: Reference line value visibility flag. Check that box to make the reference line value visible
- Font: Double click the 'Font' cell to open the font selection dialog, select a font and set its size and attributes and click 'OK'

Reference mode

Value of a reference line may be defined by different methods.

- None: No reference line (equivalent to uncheck the 'Visible' box)
- Zero: Reference line is drawn at the zero value of the graphic serie
- Min: Reference line is drawn at the minimum value of the graphic serie
- Max: Reference line is drawn at the maximum value of the graphic serie
- Average: Reference line is drawn at the zero average of the graphic serie
- Custom: Reference line is drawn at the value defined by the user in the 'Value' cell

Example of a graphic using reference lines:



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Appendix

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Line styles

Five line styles are available



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